



FRIDAY, NOVEMBER 26.

Train Accidents in October.

The following accidents are included in our record for the month of October:

COLLISIONS.

REAR.

1st, a. m., freight on New York Central & Hudson River ran into work train just backing into siding near Peekskill, N. Y., damaging engine and 5 cars. There was a heavy fog at the time.

1st, p. m., work train on Chicago, Milwaukee & St. Paul ran into rear of freight near Ellendale, Dak., wrecking the caboose, killing 3 trainmen and injuring 3 others.

1st, p. m., passenger train on Western Maryland ran over a misplaced switch and into passenger train standing at Emory Grove, Md., damaging both engines.

1st, night, freight on Pennsylvania Railroad broke in two near Mountville, Pa., and rear section ran back down grade and into freight standing on the main track, wrecking several cars and killing a brakeman.

4th, night, coal train on Chesapeake & Ohio ran into cars broken loose from a preceding freight near Huntington, W. Va., wrecking 3 cars.

5th, very early, freight on Pennsylvania Railroad ran into preceding freight near Thomsontown, Pa., piling up 15 cars in a bad wreck.

5th, a. m., freight on New York, Lake Erie & Western ran into preceding freight in Hornellsville, N. Y., damaging 2 cars.

5th, night, freight on Boston & Lowell ran into preceding freight at Chelmsford, Mass., wrecking several cars.

6th, night, freight on Atchison, Topeka & Santa Fe ran into preceding freight near Topeka, Kan., wrecking 4 cars.

6th, night, freight on the New York & New England ran into rear of passenger train stopped at Willimantic, Conn., damaging several cars. No signal out.

7th, a. m., freight on Buffalo, New York & Philadelphia ran into preceding freight, which had stopped at Belfast, N. Y., wrecking several cars and killing the conductor. The wreck caught fire and 7 cars were burned up.

7th, a. m., freight on New York, Lake Erie & Western ran into preceding freight near Owego, N. Y., damaging 2 cars. There was a heavy fog at the time.

7th, night, freight on Chicago, Burlington & Quincy ran into cars blown out from a siding at Villisca, Ia., damaging engine and 2 cars.

7th, night, freight on Philadelphia, Wilmington & Baltimore ran into preceding freight near Darby, Pa., damaging several cars and killing a tramp who was stealing a ride.

8th, p. m., freight on Missouri, Kansas & Texas ran into preceding freight stopping at Norton, Tex., wrecking 2 cars.

8th, night, freight on Louisville & Nashville broke in two near Newport, Ky., and rear section ran into forward one, wrecking 2 cars.

10th, a. m., freight on Southern Pacific ran into preceding freight near San Antonio, Tex., wrecking engine and 12 cars, killing 1 trainman and injuring 3 others.

11th, a. m., passenger train on Indianapolis & St. Louis ran into rear of freight which was going into a siding near Indianapolis, Ind., damaging some cars and injuring a brakeman.

11th, night, freight on Cleveland & Pittsburgh ran over a misplaced switch and into freight standing on a siding at East Liverpool, O., wrecking 2 engines and several cars and injuring 5 trainmen.

12th, a. m., coal train on Pennsylvania Railroad ran into preceding coal train near Old Bridge, N. J., damaging engine and 24 cars and injuring conductor. There was a heavy fog at the time.

14th, very early, freight on Louisville & Nashville ran into a car which had been blown out of a siding upon the main track near Old Deposit, Ky. The car was wrecked and 2 tramps killed.

14th, very early, milk train on New York, Lake Erie & Western ran into coal train in the yard at Newburg, N. Y., wrecking 5 cars.

14th, night, freight on Chicago & Northwestern ran into preceding freight near Devil's Lake, Wis., damaging several cars.

15th, night, freight on New York, Lake Erie & Western ran into rear of ballast train near Southfield, N. Y., damaging several cars.

18th, a. m., freight on New York Central & Hudson River broke in two near Tonawanda, N. Y., and rear section ran into forward one, wrecking several cars.

19th, a. m., freight on New York, Lake Erie & Western ran into preceding freight near Waverly, N. Y., damaging 5 cars. There was a heavy fog at the time.

19th, a. m., freight on Cleveland & Pittsburgh ran into cars broken loose from preceding freight at Earlville, O., damaging several cars.

20th, very early, freight on New York, Lake Erie & Western ran into cars broken loose from a preceding freight near Greypoint, N. Y., wrecking 2 cars.

20th, a. m., passenger train on Boston & Lowell ran over a misplaced switch and into freight on siding in Concord, N. H., wrecking 2 cars.

20th, night, freight on Delaware & Hudson Canal Co. road ran into preceding freight in Whitehall, N. Y., damaging 7 cars.

21st, early, freight on Albany & Susquehanna ran into passenger train which had stopped at Wells Bridge, N. Y., damaging the engine and 8 cars. The passenger train had stopped for some cause and sent back a signal, but did not go far enough.

21st, a. m., coal train on Delaware, Lackawanna & Western ran into preceding coal train at Chadwick, N. Y., wrecking 5 cars.

21st, a. m., freight on Sharpsville road broke in two near Sharon, Pa., and rear section ran into forward one, damaging several cars. Two passengers in the caboose were hurt.

23d, a. m., freight on International & Great Northern ran into preceding freight near Golden, Tex., damaging several cars and injuring a brakeman.

23d, night, passenger train on Detroit, Grand Haven & Milwaukee ran over a misplaced switch and into freight on a siding at Royal Oak, Mich., wrecking both engines and several cars, killing a brakeman and injuring 5 others.

25th, a. m., freight on Allegheny Valley ran into cars broken loose from preceding freight in Pittsburgh, Pa., and 2 cars were wrecked. The wreck caught fire and 7 oil cars were burned up.

25th, a. m., freight on East Tennessee, Virginia & Georgia ran into rear of construction train near Silver Creek, Ga., wrecking caboose, killing a laborer and injuring 2 others.

25th, night, passenger train on Pennsylvania Railroad ran into rear of freight which was just going on a siding in Altoona, Pa. Two cars were upset and 7 passengers slightly injured.

27th, very early, freight on Louisville, New Albany & Chicago ran into preceding freight near Cedar Lake, Ind., wrecking 10 cars and killing 2 men in the caboose. The wreck caught fire and was destroyed.

27th, a. m., freight on Pennsylvania Railroad ran into preceding freight at Thorndale, Pa., damaging 7 cars.

27th, night, freight on New York, Lake Erie & Western ran into preceding freight near Elmira, N. Y., damaging several cars.

The engine was thrown over against a freight train which was just passing on the opposite track and wrecked several cars of that train.

28th, a. m., freight on Cumberland Valley ran into some cars which had broken loose from a preceding freight on the bridge over the Susquehanna at Harrisburg, Pa., damaging several cars.

29th, a. m., freight on West Shore road ran into preceding freight near Lyons, N. Y., damaging several cars.

29th, a. m., freight on Central Vermont ran into preceding freight which had stopped at Gasset, Vt., wrecking several cars. The first freight had no signal out.

Very shortly afterwards a third freight ran into the rear of the second, and the three trains were piled up in a very bad wreck, which took nearly a whole day to clear.

30th, a. m., freight on Indianapolis & St. Louis ran into preceding freight which was just going on a siding at Mt. Jackson, Ind., damaging 4 cars.

30th, night, construction train on Louisville & Nashville ran into cars broken loose from a preceding freight near Worthville, Ky., wrecking 2 cars and injuring 3 trainmen.

31st, a. m., freight on Pittsburgh, Fort Wayne & Chicago ran into preceding freight near Rochester, Pa., damaging engine and 5 cars and injuring a brakeman.

31st, p. m., freight on New York, Lake Erie & Western ran into preceding freight near Allendale, N. J., wrecking 5 cars.

BUTTING.

2d, night, butting collision between two freights on Illinois Central near Delaware, Ia., damaged both engines, 10 cars, and injured the fireman.

7th, a. m., butting collision between two freights on New York, Pennsylvania & Ohio near Windsor, O., damaged both engines and several cars and injured the engineer.

11th, noon, butting collision between passenger and freight trains on Baltimore & Ohio near Silver Springs, Md., damaged both engines and injured 2 trainmen and 3 passengers.

12th, a. m., butting collision between freight and wild engine on New Jersey Southern at Eatontown, N. J., damaged both engines. A dense fog hid the signals at the station.

12th, night, butting collision between two freights on Chesapeake & Ohio near Staunton, Va., damaged both engines and several cars. It was caused by a dispatcher's mistake.

13th, very early, butting collision between passenger and freight trains on Wisconsin Central, wrecked both engines and several cars and injured a trainman.

19th, a. m., butting collision between two freights on Chicago & Atlantic near Marion, O., wrecked 3 engines and 15 cars. It is said to have been caused by an operator's mistake.

25th, a. m., butting collision between two freights on Chicago, Milwaukee & St. Paul near Franksville, Wis., wrecked both engines and injured a trainman. The wreck caught fire and 12 cars were burned up.

26th, a. m., butting collision between two freights on Central of New Jersey wrecked both engines and several cars. There was a dense fog at the time and a mistake in signals. One track on the bridge was under repair and only one was in use.

26th, p. m., butting collision between a passenger and a wild engine on the Chicago & Northwestern near Pine Bluffs, Wis., wrecked both engines and baggage car, killing a trainman and a tramp who was stealing a ride, and injuring 3 other trainmen.

28th, a. m., butting collision between passenger and freight trains on Wabash, St. Louis & Pacific near Edwardsville, Ill., wrecked both engines and several cars, killing 1 man and injuring another. The freight was running against orders.

29th, night, butting collision between two freights on Baltimore & Ohio near Black Hand, O., wrecked both engines and 27 cars and injured a tramp who was stealing a ride. It was caused by a dispatcher's mistake.

CROSSING.

14th, a. m., freight on Gulf, Colorado & Santa Fe ran into Missouri Pacific freight at crossing in Alvarado, Tex., wrecking 3 cars.

DERAILMENTS.

BROKEN RAIL.

30th, night, freight on West Jersey struck a broken rail near Hardingville, N. J., and 15 cars were derailed. A brakeman was caught under a car and pinned down in such a way that he was drowned in 6 in. of water. Another brakeman was hurt.

BROKEN OR DEFECTIVE FROG.

29th, p. m., freight on Illinois Central was derailed near Galena, Ill., by defective frog.

BROKEN SWITCH-ROD.

13th, p. m., passenger train on Central of New Jersey was derailed near Plainfield, N. J., by a broken switch-rod. The fireman was slightly hurt.

BROKEN BRIDGE.

3d, very early, passenger train on Canadian Pacific broke through trestle bridge near Rat Portage, Man., and 5 cars were wrecked. The wreck caught fire and was burned up. The engineer was killed, 2 trainmen and 4 passengers badly hurt.

4th, a. m., emigrant train on Southern Pacific broke through a trestle bridge near Finley, Tex., and 2 cars went down. Two trainmen and 3 passengers were hurt.

SPREADING OF RAILS.

5th, noon, construction train running backwards on Ft. Worth & New Orleans was derailed near Sycamore, Tex., by spreading of the rails, and the caboose upset, killing a laborer and injuring 3 others.

6th, a. m., passenger car on Illinois Midland was derailed near Arcola, Ill., by spreading of the rails, and 1 passenger was hurt.

7th, a. m., freight on Michigan & Ohio was derailed near Tecumseh, O., by spreading of the rails.

13th, night, passenger train on Utah & Northern was derailed near Battle Creek, Utah, by spreading of the rails. The engine upset, injuring the engineer and fireman.

20th, a. m., passenger train on Asheville & Spartanburg was derailed near Asheville, N. C., by spreading of the rails and the smoking car rolled down a very high bank and was wrecked, injuring a trainman and 8 passengers.

20th, a. m., passenger train on St. Louis, Arkansas & Texas was derailed near Clarendon, Ark., by spreading of the rails.

28th, a. m., pay-train on Mobile & Ohio was derailed by spreading of the rails near Murphysboro, Ill., and 4 trainmen were slightly hurt.

27th, a. m., freight on Missouri Pacific was derailed near Leavenworth, Kan., by spreading of the rails.

29th, early, freight on Buffalo, New York and Philadelphia was derailed near Tuscarora, N. Y., by spreading of the rails.

30th, night, freight on Oregon Pacific was derailed near Corvallis, Or., by spreading of the rails.

BROKEN WHEEL.

30th, a. m., 3 cars of coal train on New York, Lake Erie & Western were derailed near Starucca, Pa., by broken wheel.

30th, night, construction train on Union Pacific was derailed near Lost Creek, Utah, by broken wheel. A laborer on the train was hurt.

30th, a. m., 2 cars of freight on New York Central and Hudson River were derailed near Peekskill, N. Y., by broken wheel.

BROKEN AXLE.

1st, night, freight on Baltimore & Ohio was derailed at Bristol, O., by broken axle.

6th, a. m., freight on Philadelphia & Reading was derailed near Birdsboro, Pa., by broken axle.

7th, a. m., freight on Lake Shore & Michigan Southern was derailed near Batavia, O., by broken axle.

16th, night, freight on New York & New England was derailed near Plainville, Ct., by broken axle.

29th, a. m., several cars of freight on Pennsylvania Railroad were derailed at Jamesburg, N. J., by broken axle.

BROKEN TRUCK.

7th, very early, freight on Union Pacific was derailed near Beatrice, Neb., by broken truck.

30th, p. m., freight on Virginia Midland was derailed near Lovington, Va., by broken truck.

ACCIDENTAL OBSTRUCTION.

2d, p. m., freight on Cincinnati, Indianapolis, St. Louis & Chicago struck some boards which had been dropped on the track by a passing truck near Delhi, Ind., and the engine was derailed, killing the engineer.

4th, noon, freight on St. Paul, Minneapolis & Manitoba was derailed at Anoka, Minn., by a jackscrew which some trackmen had left on the track.

14th, night, passenger train on New York, Lake Erie & Western struck a large tree which had been blown down across the track near Tonawanda, N. Y., and was derailed. The fireman was slightly hurt.

31st, a. m., freight on Oregon Railway & Navigation Co. road ran into rock fallen on track near Alkali, Or., engine and 15 cars were derailed, killing 2 trainmen and injuring another badly.

CATTLE ON TRACK.

19th, p. m., construction train on Burlington & Missouri River ran over a cow near Fairfield, Neb., and the whole train was derailed, killing 5 laborers and injuring 9 others.

26th, a. m., passenger train on Louisville & Nashville ran over a horse near Memphis, Tenn., and was derailed. Engineer hurt.

28th, night, freight on Cincinnati, Washington & Baltimore struck a horse which was caught fast in the ties on a bridge over the Ho king River at Guysville, O., and was derailed. The locomotive and 3 cars passed over the bridge on the ties, but the fourth car struck a post of the bridge and knocked it down, and 15 cars went down with it into the river.

WASH-OUTS AND LAND-SLIDES.

4th, very early, passenger train on Southern Pacific ran into a wash-out near Sierra Blanca, Tex., wrecking engine and 3 cars, injuring a trainman and 5 passengers.

31st, very early, wrecking train on Oregon Pacific ran into land-slide near Corvallis, Or., wrecking engine and 2 cars, killing 2 trainmen and injuring another.

MISPLACED SWITCH.

1st, night, freight on Port Jervis & Monticello was derailed in Port Jervis, N. Y., by misplaced switch.

5th, a. m., freight on Missouri, Kansas & Texas was derailed in Tyler, Tex., by misplaced switch. A brakeman was hurt.

8th, a. m., freight on Richmond & Danville was derailed in Atlanta, Ga., by misplaced switch.

8th, p. m., freight on New York, Lake Erie & Western was derailed near Narrowsburg, Pa., by misplaced switch.

15th, a. m., passenger train on New York, Lake Erie & Western was derailed in the Jersey City yards by a misplaced switch.

28th, very early, passenger train on Chicago, Milwaukee & St. Paul was derailed near Rio, Wis., by a misplaced switch. The engine and 4 cars were wrecked. The wreck caught fire from the stoves and 3 of the cars were destroyed. The fire spread so quickly in the rear car that it was impossible for the people to escape. Only 3 of them got out, and it is believed that 17 were burned to death. The switch had been left open by a freight which had just before gone into the siding.

MALICIOUSLY CAUSED.

6th, night, passenger train on Boston & Maine struck a tie laid across the track in Salem, Mass., and locomotive was derailed.

23d, a. m., engine of passenger train on Cresson & Clearfield was derailed near Fallen Timber, Pa., by a spike which had been wedged in between two rails at a wide joint. The engine upset and engineer was badly hurt.

23d, p. m., construction train on Missouri Pacific was derailed near Greenville, Tex., by some heavy bolts which had been placed on the track. A car was wrecked and a laborer killed. A boy has been arrested and held for trial.

UNEXPLAINED.

8th, p. m., work train on Missouri, Kansas & Texas was derailed near Hillsboro, Tex., wrecking 8 cars, killing brakeman, injuring foreman and 7 laborers.

11th, a. m., freight on New York Central & Hudson River was derailed in East Rochester, N. Y.

14th, very early, freight on Buffalo, New York & Philadelphia was derailed near Machias, N. Y., and 5 cars damaged.

15th, a. m., engine of freight on Toledo & Ohio Central was derailed in East Toledo, O.

18th, a. m., passenger train on Kentucky & Indiana Bridge was derailed in Louisville, Ky., and 2 trainmen hurt.

19th, very early, passenger train on Evansville & Terre Haute was derailed near Ingle, Ind., and two cars upset.

23d, a. m., passenger train on Grand Trunk was derailed in Detroit, Mich. Three trainmen slightly hurt.

25th, night, freight on San Francisco & North Pacific was derailed near Penn's Grove, Cal., wrecking 12 cars.

OTHER ACCIDENTS.

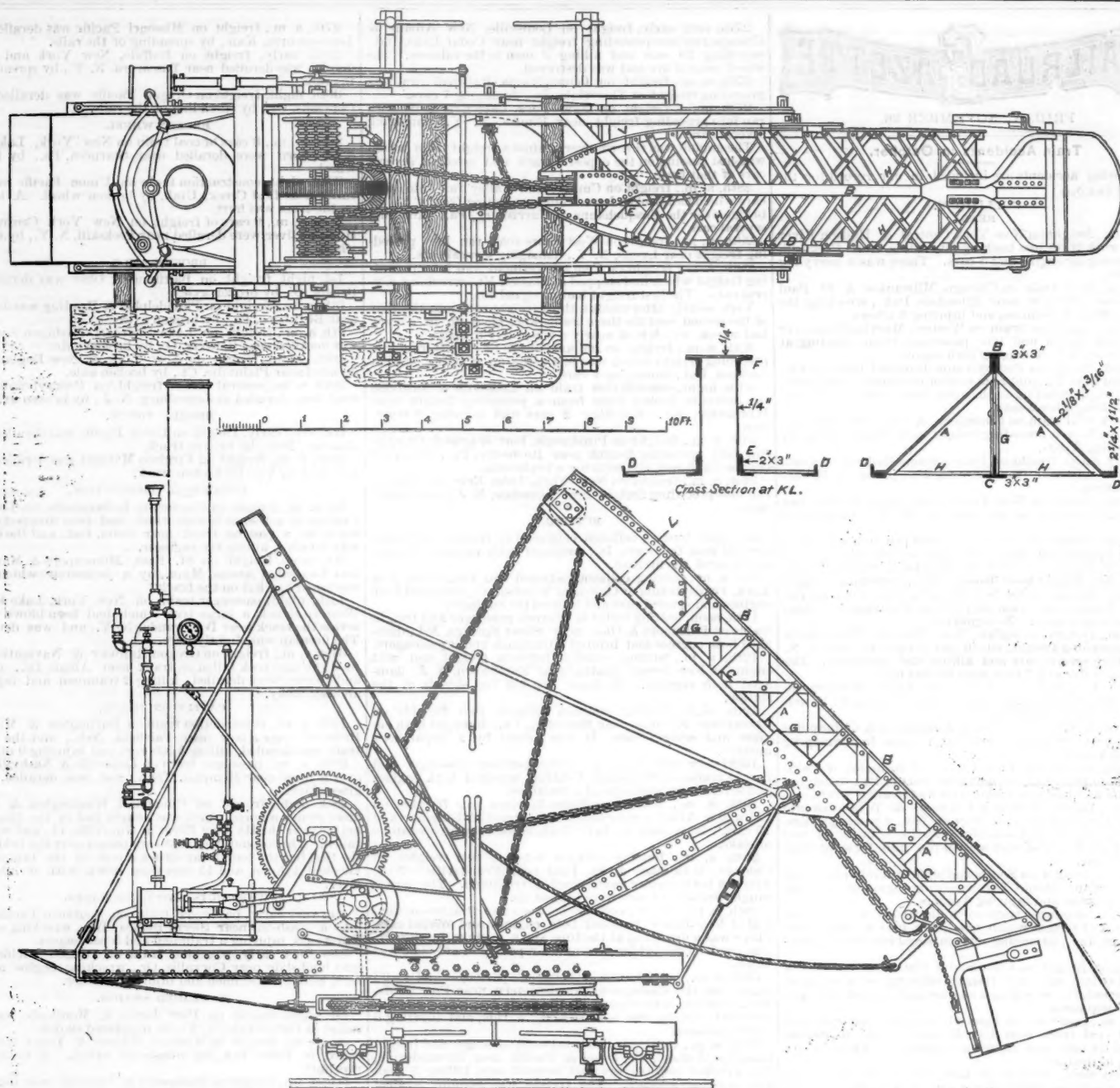
CYLINDER EXPLOSIONS.

19th, a. m., engine of passenger train on New York, Lake Erie & Western blew out a steam chest when near Lackawaxen, Pa.

24th, night, engine of passenger train on Manhattan Elevated blew out a cylinder-head at Seventy-sixth street in New York, blocking the road for some time.

BROKEN PARALLEL-ROD.

11th, night, engine of passenger train on New York, On-



NEW EXCAVATOR—OSGOOD DREDGE COMPANY.

tario & Western broke a parallel-rod when near Norwich, N. Y., and the loose end tore a large hole in the boiler.

BROKEN AXLE.

18th, night, engine of freight on Philadelphia & Reading broke a driving axle when near Norristown, Pa. The axle broke close to the wheel and the detached wheel was thrown up against the tender, knocking the conductor off and injuring him very badly. The parallel-rod was, of course, broken, and the loose end tore up the footboard and injured the engineer, throwing him from the engine. The fireman was badly scalded by escaping steam.

SUMMARY.

This is a total of 118 accidents, in which 48 persons were killed and 106 hurt. As compared with October, 1885, there was a decrease of 5 accidents, an increase of 17 killed and a decrease of 28 injured.

The ten months of the current year to the end of October show a total of 966 accidents, 334 killed and 1,198 hurt; a monthly average of 97 accidents, 33 killed and 120 injured.

A fuller statement of the totals and averages, with a summary and statement of the causes of these accidents, will be found in another column.

New Excavator, Osgood Dredge Company.

The engraving herewith shows an excavator of an entirely new design in some of its details, recently patented and built by Mr. John K. Howe, Secretary and Treasurer of the Osgood Dredge Co., of Albany, N. Y. It has been tested by a season of extremely hard work, digging clay in the brickyard of Mr. Hamilton, at Croton, and, we are told, proved itself remarkably efficient and successful.

Its novel points of advantage are claimed to be: 1. A more efficient application of power, enabling the work to be done with a smaller engine. 2. Simpler construction, giving fewer wearing parts. 3. Greater adaptability, as it digs and dumps at any point in a complete circle. 4. Ease and economy of handling, as all the movements are made by one man only. 5. Cheapness, as owing to its lightness and simplicity of construction it can be built for half to two-thirds of the cost of an ordinary steam shovel of equal capacity.

By using the dipper handle as a lever (of course increasing its strength to stand the breaking strain) the heavy and expensive crane is avoided, and the power is applied almost exactly in the direction in which it does the most effective work, i. e., parallel to the cutting face of the dipper, and by

fastening the hoisting drum to the upper end of the handle, instead of pulling the dipper away from the bank, and requiring special crowding apparatus to overcome this pull, the hoisting chain both digs and crowds the dipper into the bank at the same time and by the same motion; while in hard digging the power may be multiplied two or three times by varying the leverage of the dipper handle. The mechanical merit of this feature of the design is clear.

The dipper is kept from sliding out too far or crowding too fast into the bank by the backing chain, which regulates the distance at which it works. The dipper handle is made of T and angle iron, braced, of triangular section, as shown. It is free to slide lengthwise in its saddle, except as controlled by the backing chain. The height of the saddle may be changed by adjusting the stay rod. All the machinery, including the engine and boiler, is mounted on a frame of channel iron (containing water tank), which revolves on coned rollers inside of the cast-iron turntable. On the crank shaft of the engine are two level pinions with band frictions which drive the upright swinging shaft. This has a chain pinion on its lower end, from which an endless chain passes over two lightning sheaves around the base of the turntable, so that by frictioning one pinion the whole upper part of the machine revolves in either direction and as far as may be desired, and by releasing both pinions it remains stationary.

The car is built of wrought-iron I-beams, and is steadied while at work by four steel jack-screws. The machine is moved up to its work by swinging the dipper to the rear and "kicking" the excavator forward.

The machine here illustrated has a 3/4 yard steel dipper, a 6 1/2 x 8 in. double cylinder engine with two independent friction drums, and weighs 10 tons. It digs 15 ft. from centre of track and dumps 10 ft. above track. Its speed in clay is two dippers per minute; in gravel, three dippers.

It is handled by a crew of two men only, engineer and fireman.

It is built entirely of iron and steel and has stood two cave-downs of a heavy bank without any injury. The season's work has proved it remarkably powerful, rapid and durable.

The Osgood Dredge Co. is prepared to build these excavators of any size and capacity, and announces that it will guarantee them to be cheaper, lighter, stronger, more durable,

more easily handled and more economical than any others. Whether one be prepared to accept so broad a claim or not it is obvious that the design has many points of conspicuous merit.

Stations on the Philadelphia, Germantown & Chestnut Hill Railroad.

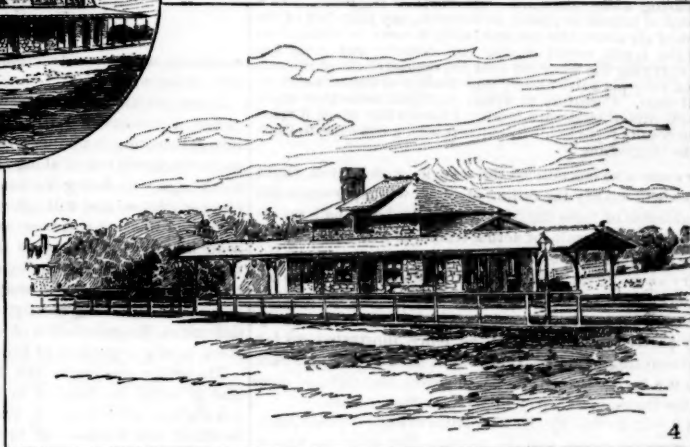
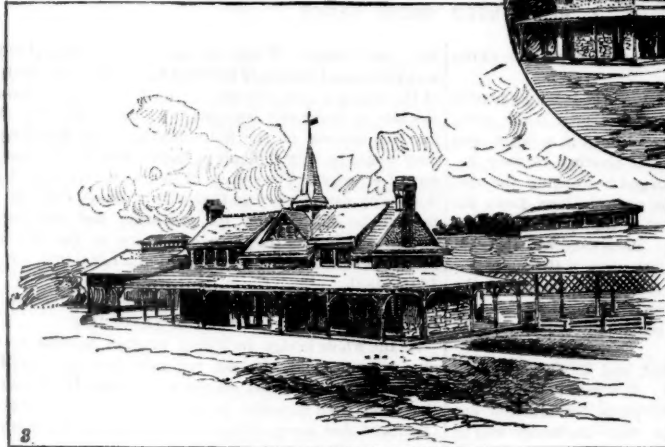
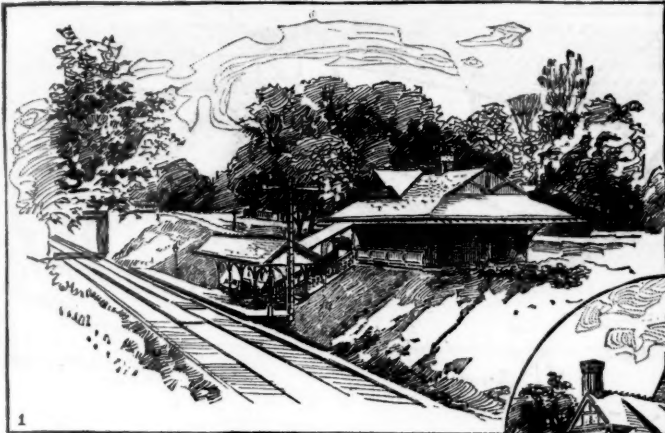
We are indebted to the Sanitary Engineer for the very neat views and plans of several stations on this short line of road, running from Philadelphia to Chestnut Hill, which we take from its weekly series of architectural plates. No. 1 is the Allen's Lane Station; No. 2, Chelton Avenue, of which the little circular view in the centre shows the other side; No. 3 is the station at Chestnut Hill, and No. 4 is the station at Chelton. The station at Allen's Lane is of brick; the others are of stone, with some half-timber and shingle work in the upper stories. The stations were designed by W. Bloddy Powell, Architect of the road, and are very creditable specimens of suburban stations. The designs have the merit, especially Nos. 1 and 4, that they can be modified for less expensive structures, while still preserving the pleasing general effect.

The Western Railway Club on Locomotive Wheel-Centres and Tires.

This subject was discussed at a meeting of the Western Railway Club, held at Chicago Nov. 17, President Scott in the chair.

The following statement made by Mr. W. L. Gilmore shows average results obtained from 25 engines on Michigan Southern Division Lake Shore & Michigan Southern Railway, statement concluded after fourth turning:

	AVERAGES.		
	Thickness of tire.	Mileage.	Mileage per 1-16 in. wear.
New	3 in.		
Before first turning		28,910	7,570
After " "	3 1/4 in. full.	37,873	7,039
" second	2 3/4 in. full.	32,939	6,198
" third	2 in.	37,028	6,659
" fourth	1 1/2 in.		



1. Allen's Lane Station.
3. Chestnut Hill Terminus.

Rear View of
Cheltenham Ave. Station.

2. Cheltenham Ave. Station.
4. Wissahickon Station.

STATIONS ON THE PHILADELPHIA, GERMANTOWN & CHESTNUT HILL RAILROAD.

W. BLEDDYN POWELL, Architect.

Mr. H. L. COOPER (Lake Erie & Western), found 4 in. tires wore well, and preferred them to thinner tires.

Mr. G. W. RHODES (Chicago, Burlington & Quincy): The 3-in. tire gives considerably more mileage per $\frac{1}{4}$ in. than the 4-in., comparing similar engines. On switching engines with 16 in. by 22 in. cylinders, 44 in. centres, and 59,338 lbs. on the drivers, the 3-in. tires have given an average total mileage of 131,267 miles before being worn out, being at the rate of 4,250 miles per $\frac{1}{4}$ in., while the 4-in. tires have only given an average total mileage of 133,956 miles, or but little more than the 3-in. tires. The mileage per $\frac{1}{4}$ in. of the 4-in. tires was only 3,252 miles. Similar results were given under other classes of engines. Nearly all these engines use the driver brake constantly. Manufacturers state that they cannot make 4-in. tires of as good quality as 3-in.

Mr. J. N. LAUDER (Old Colony) urged the importance of using standard sizes of driving wheel centres, and of making

them to gauges to be procured of the Pratt & Whitney Co., not trusting to measurements by rules, etc., which are always $\frac{1}{8}$ in. to $\frac{1}{4}$ in. out. The flange and tread should also be uniform, so that tire makers could keep tires in stock, which would be especially convenient to small roads. Care in boring tires and turning centres the right sizes will prevent breakage of tires.

Mr. CHAPMAN (Midvale Steel Co.): The adoption of standard sizes would also benefit tire makers, who now have to keep numerous rolls in stock, each set costing about \$500. A tire 4 in. thick will not probably give as much mileage per $\frac{1}{4}$ in. of wear as a 3-in. tire.

Mr. JOHNSON (Chicago, Burlington & Quincy) thought that if the tire makers put down more powerful rolls, they could compress the 4-in. tire sufficiently to make it equal a thinner tire in wearing qualities.

Mr. QUAYLE (Chicago & Northwestern): On our Iowa Division

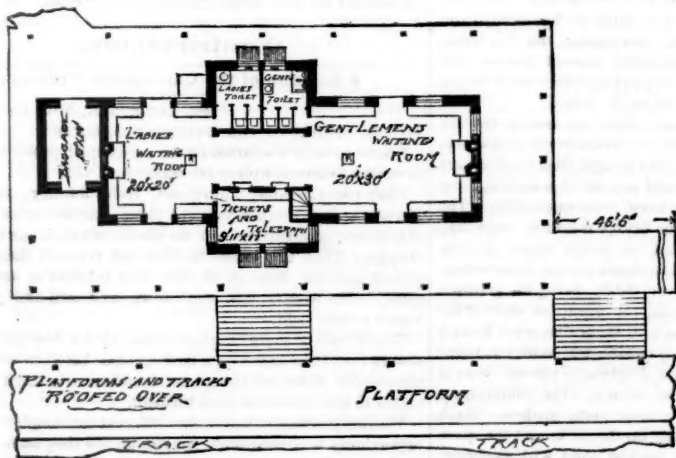
some English 4-in. tires have given nearly 18,000 miles per $\frac{1}{4}$ in., a better result than any tire we have ever had. Probably with heavier rolls, 4-in. tires would fully equal 3-in.

Mr. LAUDER thought that a driver brake, with the Ross brake shoe, caused no extra wear on the tires.

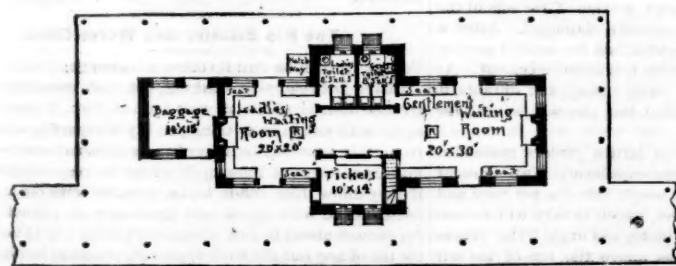
Mr. A. SINCLAIR (National Car-Builders) urged that the form of the wheel tread and flange was more important than the thickness and be settled now, as the same rolls could turn any thickness.

Mr. QUAYLE moved: "That it is the sense of this meeting that the master mechanics ought to adopt the section of tire (as regards form of flange and tread) adopted by the Master Car-Builders' Association." Carried.

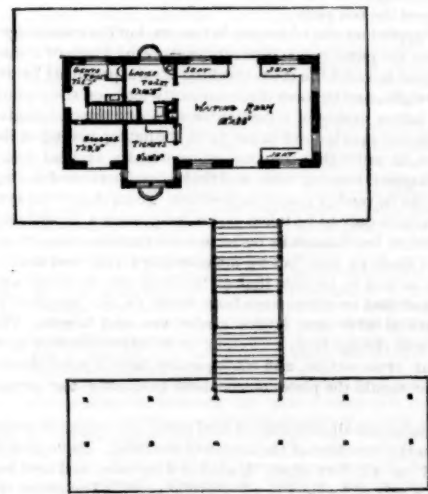
The Rules of Interchange were then discussed by Messrs. Rhodes and Marden, the discussion being adjourned to the next meeting, when Mr. B. K. Verbruyck will open the debate.



Chestnut Hill Station.



Cheltenham Avenue Station.



Allen's Lane Station.

PLANS OF STATIONS ON THE PHILADELPHIA, GERMANTOWN & CHESTNUT HILL RAILROAD.

A Reinvented Snow Fence.

The accompanying engraving, which we find in *Engineering*, is another illustration of the fact that there is nothing new under the sun, the identical plan suggested having been given with an engraving very similar to the above in the *Railroad Gazette* of Oct. 3, 1884. It has now been reinvented and patented in England by Mr. W. Lamond Howie, of Eccles, England, and it seems so entirely reasonable and promising a device for use in certain localities that we reproduce it as one well worthy of attention and trial. It is now, of course, past patenting in this country. Our correspondent who sent us the cut Oct. 3, 1884, a division superintendent on one of the Minnesota railroads, thus described its origin:

"During a blockade in Southwestern Minnesota last winter, when remedies were naturally under discussion, a friend called my attention to a granary that was set on blocks about two feet from the ground. While the drifts were piled up all around it, we could walk entirely around close to it on the bare ground. He suggested that the cause of this was that the granary was an obstruction to the wind, and that the current of air was compelled to pass around and under the building in a compressed form and with increased velocity, clearing away the snow. He further suggested that a shed-roof of boards so placed as to catch, say four feet of the current of air above the cut and carry it down to within two feet of the track, would double the velocity and clear the track, carrying the snow out over the opposite side of the cut. This is a very plausible theory and worthy of experiments on a small scale. Certainly it would cost little more than snow fences on cuts of moderate depth. I should like to see it tried and the results reported. I send herewith a drawing to illustrate the suggestion."

Every one who has noticed the way in which even slight obstacles will modify the falling of snow will appreciate the reasonableness of these suggestions, but we have had no reports since of the results of actual trial. It will be observed that the action of this device is precisely the opposite of the ordinary snow fence, which latter is placed at a distance from the cut and simply attempts to remove the snow from the air before it reaches the cut, in which it can of necessity be only partly successful, while the fence illustrated, so far from attempting to get the snow out of the air, attempts only to give it a higher velocity in passing over the rails, so that it will for the moment carry more snow than before.

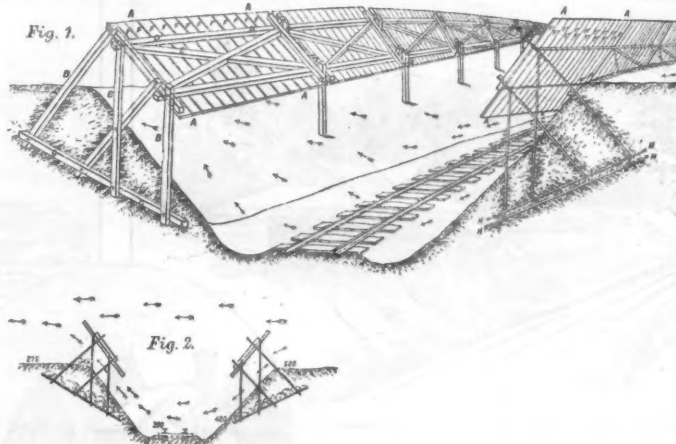
That it will do this Mr. Howie claims to have demonstrated with a working model, and the numbers following the line of the cutting in fig. 2 represent the average velocity of the wind in feet per minute at their respective positions, as indicated by an air meter during several experimental trials, and although the width of the open slits of the deflectors was one-eighth of the whole, and the wind driven by a fan of limited dimensions, it will be seen that the wind ascended the further slope and escaped into the open with a great part of its force unexpended. If, as is so often the case, the wind in severe storms is nearly always in one direction, one of the fences shown can be omitted, since that on the leeward side is rather an obstruction than advantage, and without it Mr. Howie's tests would have shown still better results.

A Visit to the Forth Bridge.

This great bridge is now fairly advancing toward completion. The foundations are all above water, the lowest portions of the superstructure for the giant cantilevers are in place on the piers and are partly riveted up, the masonry of the piers of the approach viaducts is built up to half the full height, and the iron-work of the approach viaducts is nearly finished, and rests on the piers, and has only to be raised bodily some 73 ft. higher, as the piers are built up beneath it. In the workshops at the south shore end (nearest Edinburgh) the central portions of the top booms of two of the cantilevers are being erected in the yard, and the third has been erected, marked and taken down for permanent re-erection on top of the enormous vertical tubes or posts of the cantilevers. These posts are steel tubes 12 ft. in diameter and 330 ft. high about the top of the bed plate.

The upper boom is, of course, in tension, but the great length between the panel points necessitates its being made of a suitable form to resist the cross-breaking strain produced by its own weight, and in form it consequently looks on the ground like a lattice bridge of considerable span and great strength. It is erected upside down in the yard, the flat top resting on the ground, in order that the connections with the vertical posts, their diagonal bracing tubes and the inclined portion of the top boom can be readily placed in position. To an American eye, this erection only to be taken down may seem a superfluous precaution, but it must be borne in mind that the connections are not made by pins, but by innumerable rivets, and that it is just as well to be sure that all the holes are accurate and true, and that no errors have been made in the junction of the various tubes and lattice girder ties and braces. The tubes here change from a circular to an approximately rectangular cross-section, and consequently there is some chance of error should the plates not be bent to exactly the proper form.

The tubes are all composed of steel plates, the length of which runs in the direction of the length of the tube. Each plate is planed on all four edges, heated in a furnace, and bent between a pair of formers in a hydraulic press. The plates are then assembled in the tube, which is placed in the centre of a line of rails laid down in the yard. A multiple drilling machine with engine and boiler travels along the tube, and drills some ten or twelve holes simultaneously through the assembled plates. The whole machine is inclosed in a house, the ends of which have a hole large enough to clear the tube. The men at work, therefore, are not exposed to the weather, and the machine with its house or cab travels along the tube, drilling everything accurately as it goes. The plates are then taken apart, sent to their destination out on the cantilevers, bolted in position, and will be riveted by some



A RE-INVENTED SNOW FENCE.

machines under construction, but not yet in position at the date of our visit.

These riveting machines will be worked by hydraulic power, a pressure of 1,100 lbs. per square inch being used. Several riveting machines will be contained in a large iron cage which will travel along the tube, riveting as they go. Each cage will shelter the men engaged in working the riveting machines, and will effectually protect them from the wind and weather and from any risk of falling into the water some hundreds of feet below them. Each cage will also contain a crane for lifting one by one into position the plates for the tube. Each cage will weigh 5 tons. This portion of the work will begin very shortly, and as it presents no unusual difficulties, the completion of the remaining portion of the work is only a question of time.

The bridge was begun Jan. 1, 1883, and it was estimated that it could be finished in 1890. It is now hoped, as the foundations are completed, and the plans for erection are matured and worked out in detail, that the bridge will be completed some eighteen months sooner than was anticipated. It is estimated that in riveting the tubes, etc., each riveting machine will close 300 rivets per diem.

In the skew-backs or junction of the several members at the base at the cantilevers, the united thickness of the various plates is often 4 in., and here special riveting machines are used, worked by an hydraulic pressure of no less than 3 tons per sq. in.

The shops and yard for erection are well equipped with hydraulic cranes, testing machines, hydraulic presses, large plate-edge planing machines, multiple drills, and all the tools to be found in a large bridge-works. Nothing but the buildings themselves appear to be of a temporary character. It is of course, convenient to have the shops and whole staff close to the site of the bridge, but as each individual piece of the bridge is small, the work of shaping and forming the parts could have been carried on at a distance, and the pieces transported by rail. A railroad is laid from the yard down an incline to a long pier or staging of false work, running out from the shore, past the bases of the piers of the approach viaduct to the base of the south shore or Queensferry cantilever. A similar pier, carried on piling, runs from the north shore to the pier of the north or Fife cantilever. The great central cantilever is founded on a small rocky island, Inchgarvie, in mid-stream. Thus, everything can be transported by ordinary railroad cars to the base of the end cantilevers. All material for the central cantilever must be put on steamers or barges, and landed on the island.

The Forth is a large deep water estuary or arm of the sea, and is subject to heavy gales which raise a considerable sea. On the day of our visit, the sea was so high that the steamers employed by the contractors could not effect a landing, and all communication with Inchgarvie was suspended. The greatest depth of water under the bridge is no less than 210 ft., or 35 fathoms, a depth that on many coasts is only found some miles from land. The depth of the foundations of the bridge is not great, however, 89 ft. being the greatest depth to which a caisson was sunk. A group of four cylindrical wrought-iron caissons, each 70 ft. in diameter, form a pier for each cantilever. Each caisson was sunk by being loaded with concrete carried by a diaphragm placed some 7 ft. above the cutting edge of the caisson. The diaphragms were, of course, stiffened by deep plate girders. Each caisson was sunk to a fair bearing on the rock, and the space under the diaphragm filled and packed solid with concrete. The piers are faced with white granite ashlar, the hearting being of large whitestone blocks. One of the caissons tilted on its side in sinking, and a large portion of the side of the caisson was distorted and seriously damaged. After a year's labor, the caisson was righted, and the injured portion of the iron shell replaced by blue bricks set in cement. As these bricks are particularly hard, strong, and durable, it may reasonably be expected that this pier will be none the worse for the mishap.

The trains will be carried on lattice girders suspended from the various members of the cantilever. Two lines of way will be used, the rails will weigh 120 lbs. per yard and rest on longitudinal oak timbers, which in turn will rest on ballast laid in troughs made of plates and angle irons. These troughs will project some inches above the top of the rail and will serve both as rail bearers and guard rails.

This great work requires to be seen to be appreciated. The enormous size of even the most insignificant detail impresses those who have heard and read many descriptions of

this giant bridge. While the immense amount of riveting and piece-meal system of erection will render the completion of the bridge a slow process, it must be borne in mind that the site is peculiarly exposed to sudden and violent storms, and that the size of the individual members is so large that they would be very difficult to handle with the ordinary system of erection. The system of hydraulic riveting will undoubtedly secure a bridge that with ordinary care in painting will be imperishable for centuries, and will be stable enough to admit of the passage of trains at full speed. The total cost of the bridge is estimated at £1,600,000, or about \$8,000,000.

The contractor's plant for erection and manufacture is estimated to have cost £200,000, or \$1,000,000.

As the whole bridge including viaduct approaches is just over 1½ miles long, the cost per mile is fully \$5,000,000. While this figure seems enormous, it must be remembered that it has been exceeded in many bridges in several countries, and that many of these bridges are of considerably inferior carrying power.

The following leading particulars of the bridge may be interesting:

	Feet.
Two main spans, each	1,710
Projection of cantilevers beyond pier	680
Depth of truss of cantilever	330
Extreme height of cantilever above high water	354
Diameter of tube forming bottom boom of cantilever at pier	12
lever	5
Diameter of tubes forming main vertical posts of cantilever	12
Diameter of tubes forming diagonals to main posts (over piers)	8
Centre girder, span	350
Clear height of bridge above high water	150
Approach viaduct span	168
Total length of bridge between abutments	8,091
Weight of steel in superstructure	94,080,000 lbs.

Our illustration shows very clearly the main features of the bridge. The "Minotaur," the flagship of the English Channel fleet, is represented passing under the bridge, with top masts in position, but top-gallant masts struck. This vessel is one of the largest iron clads afloat, 400 ft. long by 59 ft. beam, and is a good criterion by which to judge of the size of the bridge. The view is taken from the north or Fife shore, looking seawards. Edinburgh is some 10 miles off, behind the hills in the extreme background.

Contributions.

A Solution of the Car-Coupler Problem.

ST. LOUIS, Mo., Nov. 15, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have to offer a solution of the car-coupler problem, as far as vertical-plane couplers are concerned, viz.:

That the Lorraine, Thurmond, Hein, Janney, Dowling, Barnes and any other vertical plane coupler enter into an exhaustive competitive test to decide which is the superior coupler. That the losers in this test transfer their letters patent, and all their right, title and interest in and to the same, to the winner, and step down and out, and give the leader a clear field.

That if two or more couplers should tie for first place, they should pool their issues on a basis agreed between them, and the owners of defeated couplers should transfer their several rights to the combination so formed.

This proposition will give the different car-coupler men an opportunity to demonstrate the confidence they have in their devices, will determine which is the best vertical plane coupler, and go far toward simplifying the car-coupler problem.

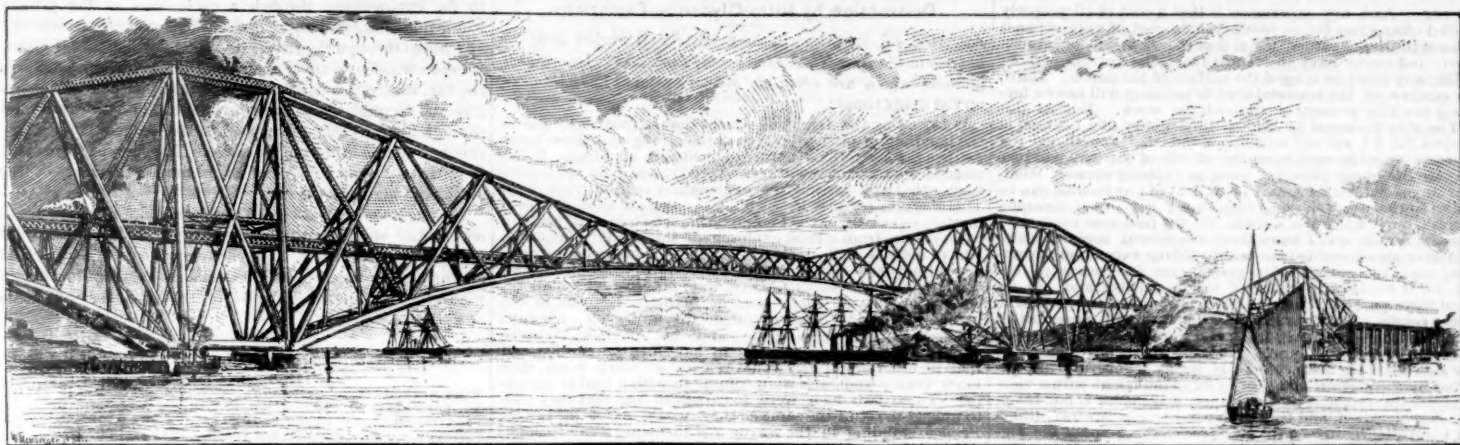
W. J. LORRAINE, C. E.

The Rio Disaster and Worse Ones.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read your scathing, yet just comments on the terrible disaster at Rio in your issue of Nov. 5, page 758. I agree with you in everything you say in regard to what must, from this time on, be regarded as criminal carelessness or mismanagement of those upon whom the responsibility rests, if they allow their roads to be operated with old style stub switches and with signals and lights such as cannot be seen far enough ahead to give adequate warning; or if they allow the use of any but the most approved, practical heating apparatus.

That accident sent a thrill of horror through the hearts of all that read the dispatches. I pray God we may never read of such another. No words, however frenzied, can picture



THE FORTH BRIDGE.

the horrible scene in its full horror. No mortal lips, no pen of man, can measure the woe and agony of those imprisoned victims, as they read their doom in the angry roar and glare of those swift approaching flames. The suffering of those few moments no one living can describe. Involuntarily we all lift a prayer that the scenes may not be repeated.

But in vain do we pray, without doing something more. The same causes will reproduce the same effects.

With all my heart I thank you for so boldly, so plainly and so rightly pointing out the causes. God helps those who help themselves. They whose duty it is should give themselves no rest till those causes are removed. Other than railway managers may find here a duty and a responsibility.

But allow me to seize upon this dire calamity to emphasize another pressing want; to bring promptly before your readers, and especially those upon whom responsibility rests, a terrible fact, before which that disaster of Rio, awful though it is, falls into almost insignificance.

Suppose at that accident, instead of some 20 persons being killed outright there had been 459 strong young men killed, right in the prime of life? Suppose, instead of some half a dozen or more wounded, there had been 4,080 maimed for life? Turning back over the pages of your *Railroad Gazette* to the issues of Sept. 18 and 25, 1885, in an editorial article we are told that in these United States not less than 459 men are killed yearly and 4,080 are seriously injured, and 13,770 "injured, but not seriously"—and railroad men know what this last means, by the continued use of the same old-fashioned draw-bar that has been in vogue nearly ever since the first train of cars was run. What a sensation would not be created by such a catastrophe, but because one is crushed to death here in the West to-day; two or three others in the East to-morrow; another on a Southern road the following night, and so on, dropping here and there two and three a day, the public are not startled nor horrified.

But there are for each of these thousands those same moments of intense and unspeakable suffering and anguish as the poor fellows go down under the wheels, carried as remorselessly to their doom as were those passengers pinned down by the broken seats and timbers in that burning car.

Would to God the suffering ended here, but the blood curdles in our veins as we try—but in vain—to measure the suffering and woe that comes to families from this yearly slaughter and maiming of men, and yet the story is only about half told. When we add the number of accidents to trainmen from falling from freight cars, from being compelled to go on top of them to use the old-fashioned brake, we have the horrible aggregate of over 18,000 accidents every twelve months here in these United States from coupling cars and falling from cars alone. Nearly three every hour; 60 men each day of the year, of 300 days each; have to pay the penalty either by his life or limb for somebody's negligence, indifference, or penuriousness, which shall we call it? Yet the public sit still and let this murder go on. Not a morning can we take up a daily paper but what we are forced to see the account of this or that brakeman having lost a hand, an arm, a leg, or his life.

I earnestly hope that the *Railroad Gazette* will remember the great influence which it might have for bringing about an end to these dangers, and stop not until the man-killing coupler and death-dealing brake are relegated to the scrap heap, never more to be used in a civilized community where life is prized above dollars and cents.

L. S. COFFIN.

FR. DODGE, Iowa.

Railroads in Sweden.

No. 19 Great George street, Westminster, S. W., }
LONDON, Oct. 22, 1886. }

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with great interest your correspondent's article on railways in Sweden, and very naturally so, having had the inspection of all the rails for the state and nearly all for the private lines since their commencement.

The progress of railway construction in Sweden presenting several points of interest to other countries also, I have at different periods published accounts of the same, and also inclose a Swedish railway guide, showing the presenting existing lines in operation; and I should be very glad to furnish any of your readers with further information on the railways in Sweden. But for your general readers, I may state that Sweden has a right to be proud of her railways. For, although one of the poorest countries in Europe by

fortune of nature, Sweden possesses more railways per head of population than any other country in Europe. They answer their purpose well, have few accidents, notwithstanding her cold climate, and as for commercial results, they are generally satisfactory. This good end has been attained by the following means: Cheap land, labor and material; wood and iron and steel rails imported free of duty; no parliamentary or financial expenses, so that all the capital subscribed has actually been used, and none gone to bribery or corruption. If Sweden was late in starting railway construction, owing to her facilities of transport by her inland canals, she has made up for lost time, and the industry of the country has so developed itself that there is now room for both the railways and the canals.

C. P. SANDBERG.

[Mr. Sandberg's documents, inclosed, show that various Swedish lines have cost from \$35,600 to \$22,350 for standard gauge, and from that down to \$7,000 per mile for some 3 ft. 6 in. lines with 18-lb. rails.—EDITOR RAILROAD GAZETTE.]

A Boston View of the Canadian Pacific.

In the course of a recent discussion in regard to competition at the Pacific Coast, one of the magnates who control the great transcontinental lines of railway said no arrangement ought to be made without including the Canadian Pacific, which now touches the western shores of the Dominion at Vancouver. About the same time the little Marquette, Houghton & Ontonagon Railroad in the northern peninsula of Michigan was bought for the Canadian Pacific. Large forces of workmen engaged in constructing a line of railroad from Lake Megantic in Lower Canada to Moosehead Lake in Maine, and thence to some seaboard port, are known to be in the employ of the Canadian Pacific.

The same great power from the icy north is engaged in purchasing and acquiring other railroad connections in the vicinity of Detroit, Mich. It has already obtained control of the Southeastern Railway, which constitutes the Montreal end of the Passumpsic route from Boston and New York, and it is understood to be more than half willing to lease or purchase the Boston & Lowell Railroad, with all of its leased lines and branches. With such wide-reaching and Napoleonic plans for absorbing the minor railroad systems across 3,000 miles of the United States, it is no wonder that the public imagination has been filled with the image of the Canadian Pacific to such an extent that it thinks it sees the hand of that great and well-subsidized corporation bearing rich gifts to every bankrupt or depressed railroad property whose stock and bonds manifest any symptoms of activity.

The advance in securities of the New York & New England Railroad, which runs from Boston to the Hudson River, has been tentatively ascribed to Canadian Pacific buying. A recent rise in the price of the shares of the Flint & Pere Marquette Railroad, which runs in a southeasterly direction across the southern peninsula of Michigan to within 14 or 15 miles of Detroit, was suggested to be due to the fact that the Canadian Pacific is buying the property and will extend it into Detroit. And a late spurt in the securities of the Wisconsin Central Railroad was half believed to be due to the acquisition of that property by the Canadian Pacific, as affording direct through lines from St. Paul, Minn., and from Ashland, on the shores of Lake Superior, to Chicago.

What, then, is this great corporation which comes down into the United States with a force and enterprise so different from anything to which we have been hitherto accustomed in the lethargic British Provinces of North America? What has been the origin of this Napoleonic railway corporation which is welcomed by some American companies as a preserver and a guardian, and is dreaded by others as an overshadowing monster? The Canadian Pacific Railroad extends from Montreal and Quebec, across the whole length of the Dominion of Canada to Vancouver's Island. It was organized partly for political purposes, and incorporated with a capital of \$100,000,000 in 1881. The Dominion Government gave it a subsidy of \$25,000,000 in money and 25,000,000 acres of land, and also transferred to it, free of cost, 713 miles of railroad built by the Government at an expense of \$35,000,000.

Since that time some changes have been made, reducing the capital of the company to \$65,000,000, ahead of which have been put \$35,000,000 of first-mortgage bonds and other liens amounting to a total of \$71,000,000, making the whole capitalization and indebtedness of the company \$136,000,000 at the time of the last annual report. Some changes have also been made in the original subsidy by which the Government enormous powers in the direction of constructing branches, establishing steamship lines and building and operating telegraphs. Moreover, the Dominion Government has guaranteed 3 per cent. per annum upon the Canadian Pacific's \$65,000,000 of capital for 10 years from August, 1883, and the company's commercial earnings are also increasing very handsomely. Canadian Pacific stock is selling at about 70.

In some of the connections which the Canadian Pacific is securing in the United States, the primary object is to obtain rich feeders, whose outpouring of traffic will offset the barren results with which the company must be content in so many cases on its own soil; but in other instances the Canadian Pacific's branches into the United States are desired as winter

outlets for the great railroad itself at the season of the year when it would be in danger of finding its Moscow in the ice-embargoed harbors of Montreal and Quebec. It is all very well to connect the wheat fields of Minnesota and Dakota and Manitoba with the European markets by way of Montreal in the summer season, when the St. Lawrence is open for navigation, but in the winter the steamers and railroads which have come together at Montreal must find other terminals.

Just where these will be obtained is still a matter of doubt. The road that is being constructed in the neighborhood of Moosehead Lake is a continuation of the International, which has extended from Lennoxville, Que., to the Maine boundary line since 1875, and was projected to run through the state of Maine and the maritime provinces to St. John and Halifax. The possibility that St. John may be the Canadian Pacific's winter harbor has excited the railroads of New Brunswick with the hope of falling into the lap of the conqueror. But the dangerous necessity of rounding Cape Sable to enter the harbor of St. John gives Portland, Me., a better prospect of becoming the Canadian Pacific's winter terminus. In that case, a more direct connection might be secured by the Portland & Ogdensburg than by the International. And so the holders of the defaulted securities of the Portland & Ogdensburg are added to the list of those who are regarding the Canadian Pacific with hopeful eyes; and last and most important here in Boston is the Boston & Lowell, which is entering into very harmonious relations with the Canadian Pacific. In fact, no other railroad enterprise on this continent has ever created quite as much excitement as this provincial enterprise, which comes across the line with a pocket full of Canadian money and a mind full of schemes for obtaining the more profitable traffic of the United States.—*Boston Advertiser*, Nov. 20.

The Care of Paint on Passenger Cars.

We give below a paper on this subject read at the recent convention of the Master Car & Locomotive Painters' Association by Mr. Joseph J. Murphy, Master Painter of the Louisville & Nashville road:

When this subject was assigned me I was pleased that I had such an easy one, as I supposed, and I did not give it much attention farther than to read the heading. After I began to look into it I found it had grown in importance, that it had assumed gigantic proportions, until they reached such a magnitude that I feel unable to handle the subject as it should be done. For, as I see it, the care and attention given to passenger cars after being painted is one of great importance. It is the most important subject that has been before us since the organization of the Association. It is a subject that has to be considered from several points and under different lights. The first is the importance of it to the different railroads. For the painting on some of the roads forms quite an item of expense. Heretofore we considered durability as the first object to be attained, and we always kept that in sight; but I think that the importance of the care and attention that a car receives after painting outranks a durable job at the start, for no matter how durable the job may be, it can very soon be ruined by the care, or rather the lack of care, it receives when in service. Another point to consider is, are the parties in charge of car cleaning as capable as they should be? do they thoroughly understand the nature of paint and varnish and how to clean it so as to get the best results without injury to the painting?

I believe, as a general thing, they do not understand it, and I have known of cars that the painting was ruined by the ignorance of the one in charge of the cleaning. Another point is the patent soaps or liquid cleaners that are on the market, and warranted to clean the cars without injury to the varnish in the slightest particular. Soaps that any one can apply, do not require to be and are not applied by intelligent men, and the result of constant use of them is soon apparent upon the varnish of the car. It would be better for the painting if no soap whatever was used on the cars when they are cleaned at the end of each trip. The changes that could be recommended to lengthen the durability of our painting are most too numerous to mention, and with a few suggestions from me I will leave the subject for you to discuss, as it will come in under the head of improvements in methods and materials.

One of the suggestions is to have in charge of the general car cleaning department one who understands the nature of paint and varnish; a practical painter would be the best one to oversee and direct the cleaning a car receives at the end of each trip. Second, for the master painter to be able to get the car in the paint shop for revarnishing, or cleaning and oiling, without revarnishing, when in his judgment the car should need it, and before the life of the paint and varnish is too far gone for the revarnishing to do it any real good. We have all found that it is not well to allow a car to run longer than nine months on its first varnish, and I am in favor of bringing in the car at the end of six months, as nearly all cars will clean speedily and well at the end of that time, while it will take longer to do the same work if allowed to run nine months, cleaning it well with pulverized pumice stone and water, using no soap, and if time will permit, apply two coats of finishing varnish, but if time will not permit, it will be safe to allow it to run on one coat, and if no varnish can be applied after cleaning, the car should have a coat of oil mixed, three parts oil and one part turpentine, and wiped off carefully, leaving no oil upon the surface of

the car. And my experience is that a coat of oil properly applied often gives better results than a coat of varnish, as it restores the life or rather the oil that the elements or atmospheric influences have abstracted from the varnish without adding any more gum upon the surface of the paint. Third, the quality of the material used in painting will have a tendency to either prolong or diminish the work. But as this will be ably discussed by Messrs. Rattenbury and Ledford in Subject No. 3 I will say no more about it. Fourth, to use finishing varnish only upon the outside of our cars will prolong the life of our painting, using no rubbing varnish whatever upon the outside, as a great deal of our trouble can be traced to the use of rubbing varnish. I have used finishing varnish only upon the outside for the past nine years with splendid results, and I know there are several members here who have also discarded the use of rubbing varnish on the outside, and the same holds good upon the inside of the car, for if we discard the use of inside varnish and use instead three parts rubbing and one part finishing we will have better results. Cars varnished in this way will clean better than if inside varnish was used, and the chances of cracking are reduced to a minimum. Fourth. Another trouble with our coaches is the body color. It is, as a general rule, selected by the general manager or superintendent with a view to please the eye, and the durability of the color is not taken into consideration, and the painter has to mix several different pigments to produce the shade selected. Some of the pigments may be fugitive in their nature and soon fade. The result is, after a few months the coach appears and is quite a different shade from what it was when first painted, and all the washing and varnishing will not restore it to its original color. To remedy this I would select the most durable pigments, discarding all those that have the slightest tendency to fade, no matter how handsome they were in color, and, if possible, use only one color without any other color being added to it. It will reduce the trouble when necessary to match an old job, for matching old faded body color is one of the many troubles that fall to the lot of the painter.

In conclusion, I will say that it is not my purpose, neither is it the object of this Association, to dictate to the general managers or master car-builders as to the color or the care and attention they give their cars; but it is a subject well worthy of their careful consideration, for, as a general rule, they themselves have to shoulder the burden of both the painting and car-cleaning upon their expense account. And to those who purchase paint stock, I would mildly suggest that the best of its kind is always the cheapest, and in no case is it more forcibly felt than in the paint shop. They purchase the best iron, the best steel and the best quality of lumber, and why not keep on to the end of the chapter and give the poor painter the best stock? They would soon find it economy to do so, and it is a consummation devoutly to be wished for.

The following paper on the same subject was presented by Mr. A. J. Bishop, of the Cleveland, Columbus, Cincinnati & Indianapolis road:

As to the proper care of passenger cars while in service very few roads have the facilities upon their lines for such care. How many roads have sheds or other buildings for the protection of their passenger equipment at terminals when such equipment is not in use? Is not the exposure of these cars to the weather more detrimental to the painting and varnishing than months of running service? In my opinion it is. Being exposed to the sudden changes from heat to cold, to frost, to rain, wind, hail, etc., and vice versa, much injury is done, especially to the varnish. The first recommendation I can offer for the proper use of passenger cars when not in use is protection from the weather by the building of suitable sheds or buildings. In the care of passenger cars railroad companies are using various modes and ingredients for the purpose of keeping their passenger cars clean in appearance and with very moderate success in many instances, and in others injury is being done to the paint and varnish. The various ways of cleaning cars at terminals that have come under my notice and of which I will make mention are, first, removing the dust by wiping over the car with waste. This aid does not remove the dust, for as I have noticed, one piece of waste is used to go over the entire car, and one, two or more cars are gone over with this same piece of waste. Therefore, while it removes the dust from the top, it also leaves a certain amount of dust remaining, not only because the waste used has become filled with dust, but because it in a measure rubs or grinds the dust into the varnish.

2d. Removing the dust by the use of a duster, hose and water, sponge and water or brush and water, many dispensing with the use of the duster. In either case the duster should first be used, and even without it the using of water as above mentioned is far better than to use waste. But for the proper care of passenger cars this is not sufficient. While it may remove the dust, that which gives our passenger cars the worst appearance is not removed—the smoke and grease. For this I find that various soaps and other admixtures are being used. With some of these the smoke and grease is removed and in many instances the varnish also, or at least each application of these soaps or other ingredients injures the varnish and shortens the life of the work. In some instances the durability of the painting and varnishing is somewhat lengthened by the use of oil.

3d. In many instances cars are washed with some of these soaps or ingredients too frequently, and in others not frequently enough; or they may be washed by incompetent men and injury done either directly under the supervision of those who know not the nature of paint or varnish. One other reason which may be given is the too great service required of cars before being revarnished. Besides the building of sheds or buildings for the protection of passenger cars when not in use, I suggest the following modes for the cleaning of cars: Inside, dusting daily, or when at any terminal; washing with a weak solution of soap and water at least once a month; to be oiled carefully once every third or fourth month with a mixture of the following proportions: two-thirds raw linseed or olive oil and one-third turpentine, to which may be added about one-sixteenth part coach Japan well mixed and applied with clean white waste or cotton cloth. Outside, dust removed daily or when at any terminal by the use of duster, hose and water, dust and then sponge and water, or with soft brush and water; in either case water used freely. Cars to be washed with a soap that can be easily applied that will act quickly with the least rubbing and be thoroughly removed with water at least once each month while in service; cars then to be oiled neatly once in four to six months with an admixture of three-fourths raw linseed oil and one-fourth turpentine, to which may be added one-sixteenth part coach Japan, this oil to be applied as mentioned for inside of cars; this will in a measure lengthen the life of the varnish and allow the cars to be in service from 24 to 36 months without revarnishing.

But it is my opinion that all cars should be varnished at least once every 12 to 18 months, thus at all times having sufficient body of varnish upon the cars to enable the washing mentioned to be accomplished safely. This would give greater care than possibly the entire amount of washing and oiling that I have referred to. Too often we find that the cars are left in service until the body of the varnish is entirely worn away or has lost its elasticity, and in many instances necessitating the recoloring of cars which otherwise would have looked bright and clean.

Destruction by Nitro-Glycerine Explosions.

An "old oil operator" in the Bradford oil region thus rehearses in the New York Times some facts as to glycerine explosions which are certainly mysterious, and have been observed many times:

"Attending the frightful deaths that so frequently follow the handling of nitro-glycerine in the oil regions, there is one feature the mysterious nature of which is startling. It has puzzled scientific observation and study, and I do not believe to-day that any satisfactory explanation can be given of it. This singular feature is the almost complete annihilation of matter, especially of the human body, which in a majority of cases results from a fatal explosion of this deadly compound. I have noticed that in many instances. I had a teamster in my employ once named Henry France. Like all men of his kind in the oil country, there was nothing either above, below, or on the earth that he feared. He was in the habit of carting nitro-glycerine to any well where I wanted to use it, and he and his partner, Warren Jack, actually got so reckless in handling the deadly stuff that no other help I had would remain at work when they knew France and Jack were coming in with a load of glycerine. These two men were so callous to fear that they used to unload the stuff the same as they would a lot of bricks, France standing in the wagon and throwing a can to Jack, who stood some feet away, and Jack catching it and placing it on the ground in time to catch the next one his companion tossed him. As it takes a man with a good set of nerves to even ride in a wagon when he knows there is nitro-glycerine under the seat, this manner of handling a compound that the slightest jar frequently explodes will give an idea of the sort of nerves these two men had. One day in 1880 France was coming in with a load of glycerine, and when he was within a quarter of a mile of the well we heard an explosion. No one ever knew how it happened, but it was one of the most complete cases of nitro-glycerine annihilation I ever saw. We found the usual cellar that a few cans of glycerine always digs in the ground when it goes off and the usual area of timber felled. Over 800 ft. off in the woods, to the right of the road, we picked up a wagon tire. We found the tail of one horse and the hoof of another. In another part of the woods a man's knee was picked up, and that was all we ever found, except Henry France's greasy cap lying by the side of a stump and his silver watch hanging on the limb of a tree.

George Doran was blown to pieces by a nitro-glycerine explosion at Red Rock a few years ago. He was a man that weighed 200 lbs. All that the most thorough search ever recovered of that 200 lbs. of flesh and bone was a part of one of the poor man's feet—less than one pound. Charles Berridge, a well-known oil man, was blown up by nitro-glycerine one winter in Allegheny County. The ground was covered with newly-fallen snow. On either side was a high and abrupt hill only a few rods apart. Berridge was a very tall man, and his weight was 180 lbs. The remains of the poor fellow were searched for carefully, but less than 15 lbs. of them could be found. The most curious part of the case, and one showing how completely annihilation accompanies an explosion of nitro-glycerine, was this: The greatest force of the explosive is always expended upward. However infinitesimal the atoms to which Berridge's body might have been reduced by this explosion, in falling back upon that spotless snow some trace of them must have been seen, but the snow remained as spotless as before. Besides human bodies, the iron frames of wagons, and even the ponderous nitro-glycerine safes, have been removed from human vision by an explosion as effectually as if they had never been formed, and the mystery of their utter annihilation cannot be explained."

Foreign Railroad Notes.

We fear that no academical occasion in this country could attract so many visitors as the Jubilee festival (500th anniversary) of the Heidelberg University in the first week of August last, in which week about 100,000 tickets were sold to that town of 25,000 inhabitants. On the day of the great historical procession, Aug. 6, about 40,000 tickets were sold; on that day 48 regular and 26 special trains ran to Heidelberg with about 1,400 cars. We had a chance to compare this with the celebration of the 250th anniversary of Harvard College, but then no special trains were required.

The French railroads show reduced earnings, or rather did in the first quarter of the year, for which they are reported at this late day.

Their total mileage and earnings for this quarter were:

	1886.	1885.	Inc. or Dec.	P. c.
Miles worked.....	18,932	18,358	+	574
Earnings.....	\$44,185,085	\$46,817,405	—	\$2,631,420 5.3
Earn. per mile.....	2.332	2.555	—	2.3 9.0
" per day.....	\$24.80	\$27.28	—	2.48 9.0

The earnings of the state railroad system (1,400 miles) were but \$6.47 per mile per day, or \$582 for the three months, which is but 4 per cent. less than last year. The meagreness of these earnings is chiefly due to their situation, the state feeling compelled to take and operate lines which had failed to earn their expenses, etc. Few lines in this country have so light earnings, and these are very much less costly than the French railroads.

The French railroads "of general interest" in the first half of this year, compared with last, had:

	1886.	1885.	Inc. or Dec.	P. c.
Miles worked..	18,932	18,358	+	574
Earnings.....	\$93,815,325	\$98,870,198	—	\$5,054,873 5.1
Earn. per mile.	4.770	5.185	—	4.15 8.0

Every railroad in the country except one-half of the Paris Belt Railroad has a decrease in earnings this year, and three of the six great companies have a very serious falling-off, namely, the Paris & Orleans (3,450 miles), 12 per cent.; the Paris, Lyons & Mediterranean (4,803 miles), 9½ per cent., and the Southern (1,908 miles), 13 per cent. The heaviest earnings per mile were on that part of the Paris Belt Railroad which lies on the right bank of the Seine, and were \$36,402 for the half-year; but this is only 12 miles long, and is a city and suburban line. Of the large systems, the Northern led with \$6,656, and the Paris, Lyons & Mediterranean with \$5,698, which is about what some of our great systems in the East earn.

The famous Siemens & Halske firm of electricians has designed a plant for an electrical railroad to be built in Budapest, partly elevated, through the heart of the city. There are to be dynamos at a central station to generate the electricity, while each car will have a secondary dynamo engine to propel it. The electric current goes from one pole of a dynamo

in the engine-house through a cable sunk in the ground to one line of isolated rails, follows this to the electric car and passes through the tire of its wheels, which are isolated between wooden disks, to one pole of the secondary engine in the car, thence through its arms to the other pole of the engine and through the tire resting on second line of rails and through the rails themselves back to the second pole of the primary engine in the engine house. The current generated in stationary dynamo engines sets in motion the arm of the secondary engine in the car.

The engine plant is designed to set in motion many cars at once, either singly, with suitable intervals, or several coupled together in small trains. The cars are about of the size and appearance of fine street cars, and as they are to connect with street car lines at each end of the road, they are made of the same gauge.

The Russian railroads report for the first half of the year:

	1886.	1885.	Inc. or Dec.	P. c.
Miles worked.....	16,170	15,622	+	548 3.5
No. passengers.....	16,875,395	17,237,724	—	362,329 2.1
Tons freight.....	21,521,240	23,640,628	—	2,119,388 9.0
Earnings.....	\$55,610,330	\$60,707,460	—	\$5,097,130 8.4
Earn. per mile.....	3.444	3.892	—	448 11.5

The decrease in traffic and in earnings is very large for a European railroad system. The state railroads, of which there were 2,122 miles this year, earned only \$1,515 per mile this year, against \$1,891 last, a decrease of \$376, or 20 per cent. These earnings are as large as on many of our poorer lines, and the Russian average is somewhat greater than our average. Their earnings per mile for the half-year for six years have been:

	1881.	1882.	1883.	1884.	1885.	1886.
	\$3,232	\$3,935	\$3,781	\$3,930	\$3,892	\$3,444

Thus the earnings per mile this year were the smallest since 1881, and they were largest in 1882. Since 1881 the mileage has increased only 2,118 miles, or 14½ per cent.

There are, besides, 747 miles of railroad in Finland (which is a constitutional state of which the Czar is the monarch), and the military trans-Caspian Railroad. Finland has a Scandinavian population, very different from the Russians. All but 20 miles of its lines are state railroads. It makes a very different showing from that of Russia, having in the first half of this year carried 6½ per cent. more passengers and 3 per cent. more freight, but earned 2 per cent. less money, than last year. The Finnish roads have very light earnings, however, amounting in the first half of this year to but \$895 per mile, and its 20 miles of private railroad earned only \$302 per mile.

The receipts of through freight by the Russian railroads from vessels arriving at Russian ports, or from connecting railroads at the frontier, in the first half of the year have been, in tons:

	1883.	1884.	1885.	1886.
	477,281	346,597	347,051	383,946

Considering the great population of Russia and its long frontier on Germany and Austria, this seems an extraordinarily small amount of freight. Nearly one-half the whole this year and last was received at the frontier stations of the railroad from Warsaw to Vienna. The receipts at sea-ports, amounted to but 269,916 tons; but it must be remembered that this does not include all imports carried inland by rail, but only those which were billed over the railroad before arriving at the port, which in this country are but a small part of the whole, though immensely greater than in Russia. At Odessa, the great grain exporting market of South Russia—a sort of Chicago and New York in one (for it is a primary market as well as an export market for grain, the producing country being just back of it, as at Chicago), the railroad receipts of freight on through bills in the first half of this year were only 4,830 tons. The railroad extending from the Black to the Caspian Sea (Trans-Caucasian Railroad), at the Caspian end of which is the Russian petroleum district, and which is the natural route for carrying the materials for pipe lines, tanks, drilling and pumping machinery imported from Western Europe or from this country, received at its Black Sea termini 9,465 tons this year, against 3,011 tons last year. Such imports as these would almost certainly be billed through.

We have heretofore called attention to the very low passenger fares and very large passenger train loads on the East Indian railroads. This was well known to be secured in part by a great deal of crowding of the third and fourth-class passengers, but a recent issue of the *Indian Engineer* gives some rather appalling details of the extent to which this goes.

It appears that some complaint has been made in this matter. The native worm has turned, so to speak, and as a consequence, the Public Works Department have consulted all the local governments and have issued a circular bearing on the subject.

A response by the Consulting Engineer for State Railways to the government of India gave the details which were subsequently adopted, saying that he "thinks it desirable, in order to prevent overcrowding, [italics ours] to lay down some rule both as to seat space, floor area, and cubical contents for passengers." He then recommends that hereafter the following dimensions be prescribed, to which we add the corresponding dimensions of the Pennsylvania standard car, which are not essentially different from other American day coaches:

	Minimum.	In cars hereafter built.	Penn. R. R. standard.
Width of seat per pass.	18.0 in.	19.5 in.	18.0 in.
Floor area per pass.	3.30 sq. ft.	3.5 sq. ft.	7.36 sq. ft.
Cubic contents of carriage per pass.	22.0 cu. ft.	25 cu. ft.	50 cu. ft.

A number of roads are then mentioned on which these limits are exceeded.

When we remember what an uncomfortable place an ordinary day coach is in summer weather if packed full, and

reflect on the consequences of, first, throwing partitions across the car so as to restrict the free circulation of air; secondly, throwing the seats together so as to seat four or five on a bench, instead of two; thirdly, taking out the upholstery and using a plain board seat; fourthly, cutting down our usual speeds nearly one-half; fifthly, raising the temperature on an average 10 or 15 degrees, and sixthly, packing more than twice as many people into the same space, we must admit that the native's lot is not a happy one. One road is mentioned on which people are crowded five on a seat, into an average space of 16½ in. As the Hindoos, like other people, have breadth, as well as length and thickness, one cannot but think that the Rajputana-Malwa Railway would do well to reconstruct its car seats as Mark Twain advised the Germans to reconstruct the genders of their nouns, "in accordance with the will of the Creator, as a tribute of respect, if nothing else."

English Freight Service.

In the German treatise of Edward Frank on "The Working of English Railroads" is the following passage:

On the English railroads by far the largest number of the freight trains run at night. From the Broad street station, for instance, 17 freight trains depart between 7 p. m. and midnight. The number and times of the regular freight trains on each day are fixed weekly by the District Superintendent, and announced in writing to the employees.

When the time for dispatching one of these regular freight trains has arrived, it must start even if not fully loaded. It then gets its full load at some station on its route.

Freight trains may be dispatched ahead of time by arrangement with the next station.

There are four classes of freight trains, called:

1. Goods trains.
2. Express goods train.
3. Mineral trains.
4. Pick-up goods trains.

The goods are marked to go by these different trains, and the regulations give the number of cars that may be attached to each of these on every division of the railroad, three empty cars being counted equal to two loaded ones.

Thus on the London & Northwestern Railway, the maximum number of loaded cars is:

	Goods	Mineral
From Liverpool to Crewe.....	45	30
" Crewe to Liverpool.....	40	30
" Manchester to Macclesfield.....	35	18

The cars for mineral cars are coal cars employed in carrying coal, iron ore, stone, etc. They carry a much heavier load than the goods cars, which explains why the maximum number per train is so much smaller, though it is not explained why a train can haul 50 per cent. more goods than mineral wagons from Liverpool to Crewe, but only 33½ per cent. more from Crewe to Liverpool, and nearly twice as many from Manchester to Macclesfield.

It is a general rule that no train shall be made too large for one locomotive, and that an "express goods train" shall not have more than 60 axles, and ordinary goods and mineral trains not more than 90 axles of loaded cars, so that, according to the rule that three empties are equal to one loaded, 45 empty cars would be the maximum permitted in an express goods and 68 empties the maximum in an ordinary goods or coal train. This limitation is probably due in part to the very small brake power required. On steep grades the number of cars per train is reduced, and the comparatively short trains can be kept better in control by the engineer than longer ones, yet the brake apparatus seems entirely inadequate, the more so because the wheels provided with brakes are chiefly those of "brake vans," which carry no loads.

The rule is that a train of one engine and 30 loaded goods wagons or 20 loaded mineral wagons has only one brake van, which is in this case at the tail of the train, and serves as the conductor's car. If there are 30 to 35 goods wagons and 20 to 25 mineral wagons in the train, two brake vans are attached. If a greater number, up to 45 goods and 35 mineral cars, with two locomotives, comprise the train, there are still but two brake vans. On the London & Northwestern, between Crewe and Liverpool, with a down grade of 53 ft. per mile, a train of 28 loaded coal cars has but two brake vans. The coal cars weigh 4½ and their loads 8 tons each, the brake vans 6 tons each, making 362 tons behind the tenders, only 12 of which are carried on wheels provided with brakes. In Austria the regulations require that on such a grade one-seventh of the weight, or 51 tons, of such a train should have brakes.

THE SCRAP HEAP.

Railroad Young Men's Christian Association.

The *Monthly Reporter* of the Association in New York shows for the five months ending Oct. 31, a total attendance of 20,350 persons at the Grand Central station and 2,917 at the Thirtieth street rooms. The religious meetings have been well attended. The *Reporter* gives the following extracts from the General Secretary's report to the Committee of Management, covering five months' work:

"The following points deserve special mention: The Committee for the Visitation of the Sick, connected with the Grand Central Station since Jan. 1, 1886, has had 101 men reported to them as being in need of visitation; 54 different men have made 172 calls on these sick comrades, and during the five months since June the Committee at Thirtieth street has made 70 calls, but the number of persons upon whom these calls were made is not reported. We have found in several instances that those who were sick were in need of temporary relief, and have been able, by raising subscriptions, to provide for these contingencies.

"Membership.—We have increased our membership here since June from 485 to 640, and at Thirtieth street from 356 to 414, and the amount of money received indicates that there has been a substantial growth. In June \$57.44 was received, while in October \$89.60. The total amount received during these five months at Thirtieth street was \$393.00, while at the Grand Central station the amount received was \$310.85. The rooms at Thirtieth street have been enlarged to include a parlor, which is being handsomely and cozily fitted up for the comfort and enjoyment of our members.

"These rooms are now certainly as thoroughly equipped, with the exception of a gymnasium, as any of their kind. The Library committee for Thirtieth street is preparing to judiciously expend over \$300 for new books, which will give us a total of about 1,000 volumes in our Library."

Railroad Accidents in Chicago.

The report of a committee appointed to investigate the railroad traffic in the city of Chicago with a view of suggesting some plan by which it can be conducted with greater safety to life and property has been filed with the Executive Committee of the Citizens' Association. Statistics from the

Coroner show that 150 fatalities occurred between Dec. 1, 1884, and Dec. 1, 1885. Of those killed 26 jumped on or off trains, 5 fell from moving trains, 5 fell under trains, 1 was struck by a gate-post, 62 were run over while walking along the tracks, 30 while attempting to cross the tracks, 19 were caught between cars, and two were killed in collisions between trains. The committee has spent much time inspecting all the lines of railroad which cross streets within the city, accompanied by proper officers of the roads. From the observations made, the committee decided to recommend: 1. Statutory prohibition of trespassing upon the tracks, and enforcement of the laws in regard to jumping on and off moving trains. 2. Erection of gates at the principal crossings, with towers wherever necessary, and flags or lights at crossings where there are no gates. 3. The erection of viaducts as soon as all the circumstances, including the monetary requirements, will permit. 4. A bureau of inspection, to take charge of the business, as a specialty, under city authority. The committee further recommends that all danger signals, by flags or lights, particularly those used at night, be uniform in character. With these recommendations carried out, the committee sees no objection to modifying the law regulating the speed of trains, facilitating both through and suburban traffic. The committee consists of Messrs. Francis B. Peabody, A. A. Carpenter and Murry Nelson.—*Chicago Inter-Ocean*, Nov. 19.

Church Cars.

Railroad churches are to be attached to the trains in South Russia. Owing to the long distances traveled, and the constant work, the officials complain that they have no chance of attending divine service, so cars fitted up as churches will run on Sundays and fête days.

"Millions in It."

"Sh! but I've got it this time!" he said, as he drew a chair softly up to the desk of a fellow-speculator.

"No!"

"Sure's your born! We organize a railroad company."

"We do."

"We get a charter."

"Just so."

"The towns along the line vote enough to build and equip the line."

"They do."

"And all we have to do is to elect me treasurer and you—"

"You treasurer; not much! I take that position!"

"I must have it!"

"You shant."

"Very well; here we part. You go your way and I'll go mine. Good morning, sir."—*Wall Street Daily News*.

He Should Have a Reward.

The Burlington has at last found a man with a conscience—a genuine all-wool conscience, a yard wide and an inch thick. Six weeks ago a section man working near Endicott was injured through his own carelessness while running a hand car. The company courteously decided to allow him half pay during the time he was laid up, and a short time ago sent a check for the amount. Yesterday the money was returned with the statement that the man did not care to accept it as the company was in no wise responsible for the accident. Chief Clerk Hagerman, who opened the letter, was carried out into the open air, where he recovered after snow had been rubbed vigorously over his features. The document will be framed and hung in the office of the Superintendent of the A. & N.—*Lincoln (Neb.) State Journal*, Nov. 20.

Picked Up.

When a man comes along with a perfect apparatus for heating and ventilating street cars, he will find a comfortable fortune awaiting him.—*Cincinnati Commercial Gazette*.

We do not wish to cool anybody's ardor or to discourage anybody's projects, but would remark that if the same brains and same zeal are put into it, there is ten times as much money in farming as there is in railroad building, and ten times as much fun.—*Leviston (Me.) Journal*.

A passenger train on the Boston & Albany Railroad, due at East Albany at 6:57 last evening, was speeding along about one mile this side of Chatham, when the engineer noticed a red light on the track a short distance ahead. The train was brought to a stop. A farmer living near by had discovered a broken rail, and by covering his lantern with an old red handkerchief thereby prevented what no doubt would have been a terrible accident.—*Troy Press*, Nov. 17.

He Felt Sad.

The reader of this little anecdote, told by the San Francisco *Wasp*, will bear in mind that Oakland is a suburban city just across the bay from San Francisco.

A kind-hearted citizen was watching the crowd of east-bound overland passengers as they swore over the assessments for extra baggage and rushed about shaking hands with and kissing the friends assembled to see them off at the ferry the other day.

Finally his attention was attracted to a man who stood apart, also watching the scene, but with an expression of deep sadness and grief on his face.

"Anything the matter?" said the citizen, sympathetically.

"Are you in trouble?"

The forlorn looking man sighed, and shifted a well-worn carpet-bag to his other hand.

"I have lived in this city among these people for 18 years," he said in a faltering voice. "But now that I, too, am going away, there is no one to see me off. Nobody to shake my hand, and wish me a pleasant journey," and he brushed away a tear.

"Oh! I shouldn't feel so bad about that," said the kind-hearted citizen encouragingly. "Perhaps your friends didn't know you were going. Cheer up, my friend. Come and take a drink with me."

The lonely man sighed, but accompanied his consoler across the street, and sadly gulped down several beers.

"Well, good-bye, old fellow," said the stranger, heartily shaking the friendless man's hand. "Here, put these cigars in your pocket to smoke on the train. Good-bye and good luck to you. By-the-way, where are you going?"

"To Oakland."

The Inquisitive Baggage-man.

At the Central-Hudson station a few nights ago two very large and heavy chests were taken from a Buffalo train. They were taken into the baggage room and placed near the door. The covers of both boxes were tightly and securely strapped down, and all around the sides and on the lid were numerous holes bored through. Just after the St. Louis express had steamed away toward the Atlantic the boys, tired with a hard night's work, sat down in their room to enjoy a quiet smoke. They sat there talking and laughing for some time, when one of them heard sounds in one of the chests, which betokened that something animate was confined inside. Nothing was thought of it at first, as the noise was slight; but as the minutes flew by the sound as of some one thumping on the lid of the case was more distinctly heard.

"Hark," spoke up one of the boys. "Did you hear that noise in the chest?"

No one had noticed it, and all sat quietly listening until

the noise was repeated. This time they all heard it, and each one looked at the other in a mystified way.

"What do you suppose that is?" spoke up another.

"It might be an elephant, but it ain't," answered another.

"It might be a goat," suggested another.

Then all was silent again. At this juncture they were joined by the clerk in the transfer office, who, after listening a moment, said:

"Boys, perhaps there is a man in there. I've heard of such things."

"Now see here, boys," exclaimed one of the old baggage-men, "we'll just open that chest and see, perhaps there is something wrong there."

The boys pulled the chest out, and as they did so, the noise as of some one moving inside was distinctly heard. Then they took the straps off; every one crowded up to see what was inside. Scarcely had the lid been raised when a huge snake, of the anaconda species, pushed his head from under a pile of blankets and out onto the floor.

"Great Caesar!" yelled all in a chorus as his snakeship made his appearance; then there was a grand scramble for places of safety. One mounted a pile of trunks, another jumped up on a truck, and two others made a dash for the transfer office, and didn't forget to close the door, with all their haste. The snake was monarch of all he surveyed in the baggage-room, and no one cared to dispute his claims. Those who had sought refuge on the piles of baggage soon saw that the snake could not get out of the box entirely, as it was strapped in. As the reptile did not seem to be hostile, the boys' courage returned, and they ventured down from their perches. The subject that next arose was how to put the snake back in the box. Each proposed a scheme, which was as quickly abandoned. Finally a blanket was procured and thrown over the reptile, and the snake, as if he did not fancy the performance, slowly wriggled back into the box. The boys were not long in strapping the cover down. They agreed to keep the thing a secret, but they were, nevertheless, badly scared. But who wouldn't be?—*Rochester (N. Y.) Democrat and Chronicle*.

An Improvised Smoke Stack.

The College Hill Railroad people have had to borrow a locomotive from the Cincinnati, Hamilton & Dayton. This morning one of their engines climbed the hill, but in going under the bridge on the Grosbeck road the smoke stack was taken off. The engineer was in a fix, but he secured a flour barrel, rigged it up as a stack, and so went back to town in that ridiculous style.—*Cincinnati Times-Star*, Nov. 22.

The Punishment for Train-Wrecking.

The inadequacy of state laws for the punishment of miscreants who derail and wreck trains by tampering with switches, uncoupling cars and the like, was lately illustrated in this city. Thomas Collins, who was a ringleader in the Lake Shore & Michigan Southern strike last summer, one night recently attempted to wreck a through passenger train at Archer avenue, this city, by turning the switch wrong, while he manipulated the apparatus in such a manner that the light seemed to indicate that it was right. A one-armed flagman saw the movement, went to the switch, adjusted it properly, while the train was approaching, thus preventing a fearful wreck and probable loss of life, and then gave chase to the perpetrator of the damnable deed. The wrecker drew a pistol and aimed it at his pursuer, but two policemen saw the fracas, and soon had Collins captured and locked up. This was the second offence of the kind attempted by the miserable wretch. Yet all the justice who examined him could do was to have Collins held on the charges of violating the statutes relating to interference with railroad traffic, assault with a deadly weapon and malicious mischief; the enormity of these crimes in the eye of the law being indicated by the fact that bonds were required amounting to only \$1,700. Not being able to obtain this insignificant bail, Collins was sent to jail. If he had killed a man in a brawl, though there had been attendant extenuating circumstances, he would have been committed for trial without bail; yet compared to wrecking a railway train and thus jeopardizing life, and rendering maiming and torture certain, and horrible burning of passengers, as at Rio, Wis., the other day, possible, the killing of a man in a brawl sinks into insignificance. No murderous intent can be conceived as deserving of the extreme penalty as that of an attempt to wreck a passenger train. The perpetrator of such a diabolical act should be shown no mercy, for there are no mitigating considerations connected with a crime like that, unless insanity of the perpetrator can be shown. It is high time that train wrecking, or any attempt at it, should be classed as the blackest crime in the calendar of murder.—*Northwestern Lumberman*.

Crushed by a Land-Slide.

The *Pittsburgh Chronicle-Telegraph* of Nov. 18 says: "One of the most disastrous accidents in the history of the Panhandle Railroad occurred this morning near Singer & Nimick's mill, South Side, shortly after 6 o'clock. The limited express was speeding rapidly along toward the city, and when but a couple of miles from the Union Station it was signaled to run slowly. A land-slide had occurred, and the wrecking train was running ahead of the express. The engineer of the limited noted the signals, and reduced the speed of his train to 10 miles an hour. The rainfall of last night had been so heavy that there was a constant danger of slides. He kept a sharp outlook, and had almost passed beyond the overhanging rocks, which had caused tremors to many passengers on the road. The porters on the sleepers had just announced to their passengers, many of whom had risen from their berths, that the train was just pulling into Pittsburgh. No one had a suspicion of danger ahead. The train slowly glided along and was within the shadow of the hills at Jones' Ferry, opposite Graff, Bennett & Co.'s mill. Suddenly, without the slightest warning, an awful crash was heard. A huge mass of rock and earth, tons in weight, had become loosened at the top of the precipitous hill. They bounded down with frightful velocity, and crashed through the train with terrific force. The roofs of the three Pullman sleeping cars were crushed in, and the heavy rocks bounded in among the passengers.

"A scene of the wildest confusion ensued. Women shrieked in terror, men rushed wildly for a place of safety, while above all the noise and tumult arose the agonizing cries of distress of the wounded. They were wedged in among the stones, earth and broken timber and glass, unable to move. For a moment those of the passengers who had miraculously escaped injury were so dumbfounded that they stood motionless. The sleepers were completely filled with dust, and at first it was difficult to determine who among the number was the most seriously injured. The moment the crash was heard the engineer had stopped his train. As soon as the conductor saw the frightful results of the accident he cried to his engineer 'Hurry on to the Union station. Don't wait a minute. We must care for the injured immediately.'

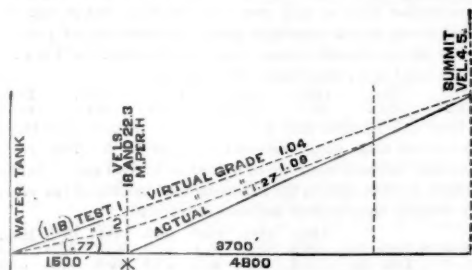
"The train was started again, and in a few minutes had arrived at the depot. There the full force of the Union station awaited with stretchers to carry out the injured passengers, who were at once properly attended to."

Eight persons were seriously injured, besides a number slightly bruised. The road at this point has been built over 30 years, and was considered entirely safe.

tend to increase grades, and how nearly our process of computing them will check, by considering what took place between the starting point and foot of the grade, 1,500 ft. off, over a NOMINALLY level grade. The virtual grade may be thus determined:

	In first test.	In second test.
Speed acquired in 1,500 ft.	18.00	22.30
Corresponding vel. head, ft.	11.50	17.67
Then we have as the virtual		
grades per station.....	11.50 = 0.77	17.67 = 1.18

In other words, in the first test the engine started off lazily and did not do as much work as after it struck the grade. In the second test the engine "pulled out lively," to gain all possible advantage from a "run" at the hill, and succeeded in doing somewhat more work than it did after it struck the grade, as is but natural from the fact that its average velocity was less and (probably) it used more sand and had a somewhat higher boiler pressure. But the correspondence is close without these allowances; quite



sufficient to indicate, what is beyond question, that the method is essentially trustworthy.

Now, had this grade, instead of being only 4,800 ft. long, been 48,000 ft. long, it will be evident that the same initial velocity would have done very little to help out the engine. To derive equal aid from momentum we should have needed to have a vertical head ten times as great in that case, or 176 ft., which would have carried the necessary initial speed up to the impracticable limit of nearly 71 miles per hour. Consequently, while short grades and short sags may be operated almost as levels with speeds of 30 to 50 miles per hour, long grades or bad sags can be but little helped out by momentum. In the one case the profile tells the truth and in the other it does not, while in all cases profiles lie dangerously at stations.

THROUGH TRUNK-LINE TRAFFIC IN OCTOBER.

THROUGH FREIGHT WEST.

The reports of the through shipments of freight westward over the trunk lines in October, from Philadelphia, Baltimore, and Boston as well as from New York (heretofore noticed), show that in all cases they were smaller than last year, though the decrease at New York was about four times as great as at the other three places, the shipments being as follows, in tons:

	1880.	1885.	Decrease.	P. c.
New York	95,649	117,191	21,542	18.4
Boston, Phila., and Balt.	70,430	75,940	5,510	7.2

The Baltimore & Ohio took some freight in October, and this is not reported; but it is believed by those who best know that it took but little, and if it had had its old share it would have brought up the total to only 108,000 tons. But New York has been shipping by canal much more than last year, and it is not probable that the total shipments from New York have fallen off much more than the shipments from other places. The aggregate shipments from New York, Boston, Philadelphia and Baltimore in October, for the last seven years, have been, in tons:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
152,518	227,504	205,878	171,194	151,634	193,131	166,079	

Thus the shipments this year were smaller than in any other of the seven except 1880 and 1884, and were 27,052 tons, or 14 per cent., less than last year.

Rates were advanced last year at the beginning of October, but they were still about 30 per cent. below the present rates, and it is probable that a very large part of the shipments of the month were taken on contracts at the tariff of June 1, which was about 45 per cent. below the present tariff. In 1881 and 1882 the rates were also about 30 per cent. below the present tariff, so that the only year when the shipments were greater than this year at the same rates was 1883. Then, and also this year, there was some secret cutting of rates, but not enough to affect the quantity of shipments.

The west-bound shipments from these four sea-board cities, from which the country is chiefly supplied with merchandise, were about the same this year as last, until May, but since then they have been:

	May.	June.	July.	Aug.	Sept.	Oct.
1880..	140,465	133,232	142,802	166,837	170,571	152,513
1881..	144,567	149,842	141,485	211,064	224,348	275,544
1882..	207,400	210,025	176,708	199,722	205,712	275,878
1883..	145,151	149,079	149,164	183,598	175,122	171,194
1884..	162,187	147,271	153,353	173,283	179,023	151,934
1885..	158,166	162,646	164,691	177,077	215,698	193,131
1886..	140,310	151,760	150,108	179,395	181,279	166,079

Thus in every month since April the shipments were less this year than last, and in every month except August very much less. This period was that of extremely low rates last year, when the railroads took most of the shipments that usually go by canal. The decrease this year was greatest in the last two months, the shipments this year and last in different periods having been:

	1886.	1885.	Decrease.	P. c.
4 mos. to April 30.....	580,729	590,682	15,593	2.7
4 mos. May 1 to August 31..	618,573	662,580	44,007	7.1
2 mos. Sept. 1 to October 31.	347,358	408,829	61,471	15.0

Thus the decrease in September and October was greater than the decrease for the entire eight months of the year previous to September. This, however, was not so much because the shipments were unusually small this year in the last two months (though they were less than the average) as because the shipments were remarkably large in the corresponding months last year, as the table shows. Indeed, the most unfavorable feature of business in the first eight months of last year was the very slight effect which the very low west-bound rates had on traffic. Heretofore when similar rates had been made, there had been an immense increase in shipments, as is shown in the above table in August, 1881, and in following months until July, 1882. In the eleven months from Aug. 1 to July 1, 1880-81, at full rates, the total shipments were 1,436,125 tons; in the corresponding 11 months of 1881-82, the rates being about one-third lower for five months and one-half lower for the other six, the shipments were 2,003,498 tons, or 40 per cent. greater. In the corresponding period of 1882-83, during the first three months of which the rates were still 30 per cent. below the standard, the shipments fell to 1,563,195 tons, or 16½ per cent. less than the year before. But the stagnation in business which had prevented the usual effect on shipments from low rates last year ended with August, and for the remainder of the year, and especially in the three fall months, the shipments were very large, and not till January last did they fall back to the level of previous years.

It seems to have been forgotten that business was unusually large in the latter part of last year, and to show with what a favorable season we are now comparing, we give below the total shipments (including those from interior New England points, not given in the above tables), for the four months from September 1 to December 31, in tons:

	Sept.	Oct.	Nov.	Dec.	4 mos.
1880.....	176,007	158,916	144,142	132,215	610,380
1881.....	233,308	237,086	191,691	170,553	832,637
1882.....	213,409	218,002	141,454	132,891	705,756
1883.....	182,852	178,901	134,516	121,652	617,921
1884.....	187,522	158,637	128,590	117,321	592,070
1885.....	226,273	203,205	154,738	137,032	721,250

Thus the shipments of these four months last year were larger than ever before except in 1881, and 22 per cent. more than the year before. It was not necessary to equal these large shipments to have a good traffic, but it is disappointing to find that so far the fall shipments have been very little greater than in the very unfavorable year 1884, and only about the same as in 1889, when rates were the same as now.

For the ten months ending with October the through shipments from these four seaboard cities have been, in tons:

Year.	Tons.	Year.	Tons.
1880.....	1,546,576	1884.....	1,611,767
1881.....	1,691,510	1885.....	1,668,091
1882.....	2,001,160	1886.....	1,546,660
1883.....	1,537,658		

Thus the shipments for the ten months this year were less than in any other except 1883, being the same as in 1880, but 6½ per cent. less than last year and 4 per cent. less than in 1884. The decrease from last year is no more than the higher rates would account for, but the rates were the same as in 1884, when business was thought to be very poor.

EAST-BOUND FREIGHT.

The trunk line shipments eastward make a much more favorable showing. These include all freight billed from the western termini of the trunk lines (Toronto, Suspension Bridge, Buffalo, Salamanca, Pittsburgh, Wheeling, etc.), or from points on connecting lines further west, whether they go through to the seaboard or to local points, and hence include some traffic on which the haul is very short, though much the larger part goes to the seaboard or to points as far east as the Hudson or the Delaware River. These east-bound shipments have been in October for seven years:

Year.	Tons.	Year.	Tons.
1880.....	1,141,607	1884.....	969,640
1881.....	946,107	1885.....	1,048,645
1882.....	934,647	1886.....	1,148,533
1883.....	966,927		

Thus the east-bound movement this year was larger than in any previous October, and not only that, but it was larger than in any other month whatever, the previous months when shipments were as much as 1,100,000 tons, having been July, 1880 (1,141,549), October, 1880 (1,141,607), November, 1880 (1,121,626), August, 1881 (1,103,235), and March, 1885 (1,121,252).

Compared with last year the increase is 9½ per cent., and compared with 1884 it is 18½ per cent. It is true, nevertheless, that there has not been that increase in this traffic that was to be expected in a country where the increase in population has been 20 per cent. since 1880, and that with two new railroads taking a part of the traffic, it is not so valuable to any of the old railroads as it was before 1883, when rates were maintained. Compared with last year, the basing rate was nominally one-fourth higher this year, and probably actually the difference was as great as 5 cents per 100 lbs.; for while rates were not maintained this year, last year outstanding contracts caused a large part of the shipments in October to be carried for much less than the regular 20-cent rate. A difference of 5 cents would mean \$1 per ton more net earnings on all shipments through to the seaboard, divided among many lines, and perhaps \$400,000 east of Buffalo and Pittsburgh, divided among the seven trunk lines.

For the ten months ending with October, these east-bound shipments over the trunk lines have been:

Year.	Tons.	Year.	Tons.
1880.....	9,355,601	1884.....	8,201,726
1881.....	9,312,804	1885.....	9,375,004
1882.....	7,793,976	1886.....	9,436,440
1883.....	8,374,735		

Thus for the ten months as well as for October, the trunk line shipments eastward were larger this year than ever before, though only ½ per cent. more than last year, 1½ per cent. more than in 1881, and 1 per cent. more than in 1880. Last year fully four-fifths of the traffic was taken at extremely low rates, varying from 10 to 15 cents per 100 lbs. for grain from Chicago to New York, and it is doubtful if there was a single dollar of profit on the whole immense ten months' traffic. This year the basis rate has been 25 cents throughout, which has been cut a great deal since navigation opened, sometimes, doubtless, down to 20 cents, but probably on the average not more than 24 cents per 100 lbs. It is, therefore, probable that the profit on this traffic has been \$10,000,000 to \$13,000,000 more than last year, of which more than a third, probably, has gone to the Eastern trunk lines. But the profits in 1880 were probably about \$10,000,000 more than this year, and divided among fewer railroads. But the results have been better on the whole this year than for two or three years previous, and it is encouraging to see this traffic grow when a rate which yields some profit is maintained.

CHICAGO FREIGHT SHIPMENTS EASTWARD.

The Chicago shipments eastward, not including live stock and dressed meat, by the pool lines in October were 168,344 tons, and the unreported Chicago & Atlantic shipments must have made them something like 187,000 tons, while they have been in October, for eight years:

Year.	Tons.	Year.	Tons.
1879.....	193,976	1883.....	198,416
1880.....	170,466	1884.....	229,464
1881.....	258,674	1885.....	242,683
1882.....	152,871	1886.....	187,000

Thus the Chicago shipments of this freight in October this year, when the total trunk-line movement eastward was larger than ever before, were smaller than in any other year in the table except 1880 and 1882, and were 23 per cent. less than last year (when low rates increased them), and 14 per cent. less than in 1884. The live stock and dressed meat shipments were largest this year, being 87,576 tons against 85,991 last year, but this still leaves the comparison very unfavorable.

The Chicago & Atlantic has not reported since February, and an estimate of its shipments for the entire eight months leaves room for a considerable error; but we have endeavored to allow too much rather than too little to it in the several months, and for the ten months ending with October, while the shipments of the roads reporting were 1,499,969 tons, we make the total shipments 1,744,000 tons, which allows the Chicago & Atlantic nearly 18 per cent. of the total shipments for the last eight months. Accepting this, we have as the total Chicago shipments for the ten months ending with October, for the last eight years:

Year.	Tons.	Year.	Tons.
1879.....	2,124,310	1883.....	1,957,222
1880.....	1,845,010	1884.....	2,307,468
1881.....	2,413,485	1885.....	2,729,683
1882.....	1,635,543	1886.....	1,744,000

Thus the Chicago shipments this year were smaller than in any other of the eight except 1882, and were 36 per cent. less than last year, when they were largest. Rates were so low for much of the time in 1879, 1881, 1884 and 1885 as to divert from the lakes to the railroads very large shipments; but rates were well maintained in 1880, and probably as well as this year in 1883, and in both those years the shipments were materially larger than this year. This is the more noticeable because the total trunk-line shipments eastward this year were larger than last year, while the Chicago shipments were 985,683 tons less. The live stock and dressed meat, which are included in the trunk-line but not in the above Chicago

shipments, at Chicago were 767,714 tons this year, against 716,206 last year, which goes but a little way toward making up for the decrease in other freight.

CATTLE AND DRESSED BEEF FROM CHICAGO.

It is, however, a notable fact that in these commodities, which are chiefly consumed in this country (live stock and fresh meat), the Chicago shipments increased more than 7 per cent. this year. A large part of the increase was in live hogs, which were doubtless mostly packed before consumption; but the change from live cattle to dressed beef has been so great that the same tonnage this year means a great deal more beef, as we shall see below.

The live cattle shipments, which for two months previous had been unusually large, and larger than last year, in October were much smaller, and smaller than last year. The dressed beef shipments were nearly the same as in September. The shipments of live cattle and dressed beef in October this year and last have been, in tons:

	1886.	1885.	Inc. or Dec.	P. c.
Live cattle	27,042	29,337	- 2,295	7.8
= beef	15,414	16,722	- 1,308	7.8
Dressed beef	27,773	24,812	+ 2,961	12.0
Total beef	43,187	41,534	+ 1,653	4.0

Thus, while the whole supply of beef shipped from Chicago was 4 per cent. greater this year, $\frac{7}{8}$ per cent. less was shipped on the hoof and 12 per cent. more was shipped dressed, so that the proportion shipped dressed increased from a trifle less than 60 per cent. of the whole last year to 64 per cent. this year.

For the ten months ending with October those shipments have been:

	1886.	1885.	Inc. or Dec.	P. c.
Live cattle	265,921	333,128	- 37,207	11.2
= beef	168,675	189,883	- 21,208	11.2
Dressed beef	237,497	188,683	+ 48,814	25.9
Total beef	406,172	378,566	+ 27,606	7.3
P. c. dressed	58.3	49.8		

Thus, while the supply of beef increased $\frac{7}{8}$ per cent., a ninth less was shipped on the hoof, and a quarter more was shipped dressed this year; and the proportion shipped dressed, which was a trifle less than one-half of the whole last year, was more than 58 per cent. this year; this latter, however, is considerably less than the proportion shipped dressed in October (64.3 per cent.). Thus the tendency continues to ship a larger and larger part of the Eastern supply ready slaughtered.

Possible Effects of a Direct Duluth-Montreal Line.

The construction of a railroad from Duluth along the south shore of Lake Superior to the St. Mary's River, there to connect with a branch of the Canadian Pacific, will open a very direct line from Duluth to Montreal, which might serve as a winter outlet to Duluth if Montreal were a winter port. From Duluth to Montreal the distance is not much greater than from Chicago to New York or Boston, but it must compete while the lakes are open with a quite direct water route; and judging by the experience of the railroads from Chicago eastward in competing with a very indirect water route, the railroad from Duluth could not command much of the only important shipments which Duluth can offer, wheat and flour, at rates which a railroad with extremely light local traffic could afford to accept. In the winter it would be different, but then the Duluth shipments would have to go beyond Montreal to Portland or Boston, about 300 miles further. But this makes the distance from Duluth to the nearest winter port *via* Sault Ste. Marie rather more than 1,300 miles, while *via* Chicago to Baltimore it would be just about the same distance, and it is probable that rates would be made at least as low *via* Chicago as *via* the Sault. The probable effect of the proposed line on the adjustment of trunk-line rates has considerable importance. To Boston and Portland, rates on exports are the same as to New York, but 5 cents higher per 100 pounds on other freight; but they are two and three cents higher than to Baltimore and Philadelphia. A new line by which the distance from Duluth to Boston should be as short as from Duluth to Baltimore might insist on making the rates to Boston from Duluth as low as to any Atlantic port. Perhaps Baltimore would not object much to this, because Duluth is too far north for it to expect to get much traffic thence in any event; but then the question comes, what shall be done when navigation is open? Will Montreal be satisfied to have the Canadian Pacific carry to Portland or Boston all winter (when only it can command wheat shipments from Duluth) for the same rates that it charges to Montreal when navigation is open? And if it charges less, what is to become of the present "differentials," which provide that rates to Montreal shall be as high as to Baltimore? Will the railroads south of the lakes consent that the rates for Duluth shall be different from those for other Western cities, so that some of the sea-board cities will be at a disadvantage so far as its trade is concerned? That is not impos-

sible. This country is so large that it is impossible to make rates such that every sea-port is equal to every other in facilities for commanding the trade of every place in the country. Going southward or southeastward from Duluth or Omaha, we must sooner or later reach a point where it will be decidedly cheaper to ship *via* New Orleans, Savannah, Norfolk or Baltimore, than *via* Boston or Montreal; and so going northward from Cairo we shall somewhere south of Hudson's Bay reach a point where Montreal is so much nearer that the charges for transportation to it must be less than to points as far south as Baltimore. The opening of a direct railroad line from Duluth to Montreal is likely to bring up the question whether Duluth is such a point. But for the fact that the rail route is not likely to get much traffic in summer, it would seem very hard to give Baltimore the same advantage there that it has further south.

It is announced that the advance of east-bound rates to the basis of 30 cents per 100 lbs. from Chicago to New York, which was proposed last week by the Central Traffic Association, did not receive all the votes of the trunk lines and consequently will not be made at present.

It is reported, but as yet the truth of the report has not been established, that some arrangement has been made between the Pennsylvania and the Baltimore & Ohio, with regard to the latter's New York traffic. As the arrangement is said to have been made in connection with Mr. Corbin, the new President of the Reading, it is not probable that it provides for the use of the Pennsylvania all the way between Philadelphia and New York, and as President Garrett denies that the Staten Island terminus is given up, it is not probable that provision is made for taking the whole freight traffic over the Pennsylvania to Jersey City. But it would be possible to make an advantageous arrangement between the three companies which should leave the Baltimore & Ohio substantially a line of its own to New York, lessen the cost of getting there, and give the Pennsylvania some income which it would otherwise lose. The use of the Baltimore & Potomac tunnel at Baltimore and of some of the Pennsylvania's facilities at Philadelphia as well as at New York, the coal traffic in the Schuylkill region which the Pennsylvania has just built into—all these are matters concerning which the three companies might advantageously contract with each other in such a way as to prevent considerable waste of money in capital expenditures and working expenses, and perhaps still greater waste of profits.

The express war which followed the change of the United States Express Co. from the Erie to the Lackawanna road, and the establishment of an express service by the Erie Company over its own railroad, has been settled. It brought down express rates to some important points dangerously near to first-class freight rates, and doubtless diverted some of the first-class freight to the contending express lines, and to that extent interfered with the agreed division of the through freight among the trunk lines. The regular express rate to Chicago is \$2.50 per 100 lbs., and this had been reduced to \$1, and there were similar reductions to other important places. The diversion of freight could not have been very important in itself, but it caused dissatisfaction in influential quarters which was dangerous. The advantage to the express companies themselves of the restoration of rates, in which the railroad companies generally share to a greater or less extent, according to their contracts and the amount of their holdings of express stock, is obvious. Of course those railroad companies which do their own express business will get the whole benefit of the advance, as they suffered the whole injury from the reductions in rates.

New York Grain Receipts in October.

The New York grain receipts in October were less than in September, but larger than in any previous month of this year; the receipts by canal falling off 1,200,000 bushels (15 per cent.) and the receipts by rail 839,000 bushels (9 per cent.). For seven successive years the receipts by rail and by water in October have been, in bushels (including flour):

Year.	By rail.	By canal.	Total.
1880	7,393,117	37.8	11,501,685
1881	7,322,076	64.5	3,886,364
1882	6,876,467	50.0	6,689,718
1883	7,280,774	45.3	8,525,300
1884	6,530,526	44.8	7,951,300
1885	6,511,395	58.7	4,215,161
1886	7,936,408	53.1	6,824,260

The total receipts in October were larger this year than in any other of the seven except 1883 and 1880, and were 35 per cent. more than last year. Most notable is the fact that the receipts by rail were larger than in any previous October, though they were less than in September of this year, and in many months when navigation was closed. The proportion of the receipts brought by rail was larger than ever before when rates were as well maintained. The receipts by canal were less than in 1880, 1883 and 1884.

The New York Central in October brought a considerably smaller share of the grain than usual; the Erie and the West Shore larger shares. The percentage of the total rail receipts brought by each railroad in October and the ten months then ending has been:

	N. Y. Cen.	Erie.	Pa.	Lack.	W. S.	Other.
Oct.	29.7	26.9	12.0	11.6	13.0	6.8
10 mos.	33.6	26.1	12.3	12.6	9.3	7.1

The percentage of the total receipts brought by each railroad in October, in each of the last seven years, has been:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
N. Y. Cen.	57.2	43.2	44.3	34.2	41.5	40.7	29.7
Erie	31.1	37.6	31.4	43.1	22.8	29.7	26.9
Pa.	11.3	19.0	23.8	15.1	16.3	14.0	12.0
Lack.				6.9	7.6	2.4	11.6
W. Shore					11.3	12.2	13.0
Other	0.4	0.2	0.5	0.7	0.5	1.0	6.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Probably all but perhaps 0.5 per cent. of the receipts charged to "other" railroads this year was brought by the Lehigh Valley, which would give to the three new roads about 31 per cent. of the whole this year; while the largest previously was 19, in 1884. The New York Central's share was smaller than in any previous October, but it and the West Shore together brought nearly the same as last year.

For the ten months ending with October the New York receipts have been, in millions of bushels:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
Oct.	141.2	121.2	89.2	106.4	91.9	104.3	107.8

Thus the receipts this year were the largest since 1881, though but little larger than in 1883 and 1885. This year, however, has been made up of a good and a bad part. In the first six months, and in the following four months of the year, the receipts have been in millions of bushels:

	1880.	1881.	1882.	1883.	1884.	1885.	1886.
6 mos. to June 30.	66.0	62.3	41.1	52.6	42.3	57.3	52.5
4 " Oct. 31.	75.2	58.9	48.1	53.8	49.6	47.0	55.3

Thus, while for the entire 10 months the receipts were but $\frac{3}{8}$ per cent. more than last year, $\frac{1}{8}$ per cent. more than in 1883, and were 11 per cent. less than in 1881; for the four months since June the receipts have been 17 per cent. more than last year, 3 per cent. more than in 1883, and only 6 per cent. less than in 1881.

October Accidents.

Our record of train accidents in October, given on another page, contains notes of 63 collisions, 51 derailments and 4 other accidents; a total of 118 accidents, in which 48 persons were killed and 106 injured.

As compared with October, 1885, there was a decrease of 5 accidents, an increase of 17 killed and a decrease of 28 persons injured.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear	50	
Butting	12	
Crossing	1	63
DERAILMENTS:		
Broken rail	1	
Broken or defective frog	1	
Broken switch rod	1	
Broken bridge	1	
Spreading of rails	10	
Broken wheel	3	
Broken axle	5	
Broken truck	2	
Accidental obstruction	4	
Cattle on track	3	
Land-slide	1	
Wash out	1	
Misplaced switch	3	
Misplaced obstruction	3	
Unexplained	8	51
OTHER ACCIDENTS:		
Cylinder explosion	1	
Steam chest burst	1	
Broken parallel rod	1	
Broken axle not causing derailment	1	4
Total number of accidents	118	

Ten collisions were caused by trains breaking in two; six by fog; five by failure to use signals properly; four by mistakes in orders or failure to obey them; four by misplaced switches; two by cars blown out of sidings upon the main track, and two by wrecks of other trains.

Both the broken bridges which appear in the record were wooden trestles. Another bridge failure is recorded where the train derailment was due to another cause, and the derailed cars broke down the bridge.

A general classification of these accidents is made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road	15	..	..	15
Defects of equipment	10	30	4	44
Negligence in operating	43	6	..	49
Unforeseen obstructions	10	9	..	19
Maliciously caused	3	..	..	3
Unexplained	8	..	..	8
Total	63	51	4	118

Negligence in operating is thus charged with 41.5 per cent. of the total number of accidents; defects of equipment with 20.3 and defects of road with 12.7 per cent.

A division according to classes of trains and accidents is as follows:

	Collisions.	Derailments.	Other.	Total.
To passenger trains	1	18	3	22
To a pass. and a freight	10	..	..	10
To freight trains	52	33	1	86
Total	63	51	4	118

This shows accidents to a total of 181 trains, of which 39 (18.2 per cent.) were passenger trains and 148 (81.8 per cent.) were freight trains.

Of the total number of accidents 66 are recorded as happening in daylight and 52 at night. This is an unusually large proportion of night accidents.

The number of casualties resulting from the different classes of accidents was as follows:

	Killed.	Injured.	Total.
In 63 collisions.....	16	43	59
In 51 derailments.....	32	80	92
In 4 other accidents.....	48	3	51
Total, 118 accidents.....	48	106	154

Twenty-one accidents in all—11 collisions and 10 derailments—caused the death of one or more persons each; 25 in all—11 collisions, 13 derailments and 1 other accident—caused injury, but not death. This leaves 72 accidents—41 collisions, 25 derailments and 3 others—being 61 per cent. of the whole number, in which there was no injury to persons serious enough for record.

The killed and injured persons were divided as follows:

	Killed.	Injured.	Total.
Employees.....	24	71	95
Other persons.....	24	35	59
Total.....	48	106	154
Per cent. of employees.....	50.0	67.0	61.7

The number of persons other than employees killed was brought up largely by the Rio accident. Several tramps stealing rides are found in the list, both among the killed and the injured.

The notable feature of the record is the large number of collisions, which formed over half the total number of accidents. No special cause for this can be assigned, but the record certainly shows clearly the necessity for continuous brakes on freight trains, and very emphatically the necessity of stronger and better draw-gear.

The worst accident of the month, and probably of the year was the derailment at Rio, caused by a misplaced switch. In this case, however, the large number of casualties was due to the burning of the cars after the derailment. Had not the cars caught fire, the accident would have passed almost unnoticed, causing some severe injuries, but probably not a single death.

For the year ending with October the record is as follows:

	Accidents.	Killed.	Injured.
November.....	96	19	118
December.....	74	31	153
January.....	94	40	90
February.....	98	21	157
March.....	81	49	131
April.....	66	23	105
May.....	93	23	170
June.....	75	33	86
July.....	91	33	88
August.....	115	31	117
September.....	135	42	148
October.....	118	48	106
Total.....	1,136	383	1,499
Total, same months, 1884-85.....	1,248	328	1,498
" 1885-86.....	1,234	384	1,869
" 1886-87.....	1,679	472	1,903

The yearly average for the four years was 1,322 accidents, 392 killed and 1,685 hurt; the monthly average for last year was 95 accidents, 32 killed and 122 injured.

The averages per day for the month were 3.81 accidents, 1.55 killed and 3.42 hurt; for the year there were 3.11 accidents, 1.05 killed and 4.02 injured.

The average casualties per accident were, for the month, 0.407 killed and 0.898 hurt; for the year, 0.337 killed and 1.293 injured.

The month makes an unfavorable showing, its averages having been considerably above those of the year, except in the number of injured. With the exception of September the record is worse than that of any month for a year past.

The First Locomotive with a Truck.

Matters of undoubted fact, well-known to many, soon become with the lapse of a few years matters of history about which there may be many conjectures, none of which can be accepted as undoubtedly correct. The first engine truck was only built some 50 years ago, but it is already a disputed point as to whether it was designed in America or at Newcastle-on-Tyne. The honor of the invention is claimed by both.

The American side of the case has been stated repeatedly and is summarized below, but the exact grounds on which the English claim is based are not so well known, and we have therefore taken some pains to ascertain the facts as recorded in old patent specifications, the evidence given in the celebrated Winan's eight-wheeled car case and the books of the engine works founded by George Stephenson at Newcastle-on-Tyne. It is often claimed that the first engine with a truck was built at these works, but as we shall see, that statement is incorrect. The leading facts as to the American origin of the truck may be stated as follows:

Between 1847 and 1853 Ross Winans sued several railroads for infringement of his patent for an eight-wheeled car. He claimed that the car trucks described in his patent were made and patented in October, 1834. Some witnesses stated and others strongly denied that the drawings of the trucks for the car "Columbus," built at the Mount Clare shops of the Baltimore & Ohio Railroad in 1831, were made by Winans.

Gridley Bryant testified that he made eight-wheeled cars for the Quincy Granite Railroad, Mass., in the spring of 1829. These cars had two four-wheeled trucks free to swivel round a centre pin or ring bolt and side bearings or friction plates. The wheels revolved on the axles. The curves on the various branches varied from 150 ft. radius to 400 ft. radius. A sixteen-wheeled car to convey a granite block weighing 60 tons was constructed in 1833. Engineers from the Albany & Schenectady and Charleston & Columbia Railroad visited the Quincy Railroad before the former roads were built. The cars were in use then and shown to visitors. The draft was from the truck frame. The cars conveyed stone only and were drawn by horses. These cars were permanent and not temporary structures.

Several witnesses testified that eight-wheeled cars, consist-

ing of two four-wheeled cars, each carrying a swiveling bolster and connected by three longitudinal stringers, were built by Conduce Gatch, then in the employ of the Baltimore & Ohio Railroad. These cars were first used in April or May, 1830. Conduce Gatch, in spite of a very severe cross-examination, also maintained that the first eight-wheeled passenger car, the "Columbus," was built by him from his own designs. This car made a first trip about July 3, 1831.

It was urged on behalf of Mr. Winans that Gatch's eight-wheeled cars were merely temporary affairs for carrying timber, and that the "Columbus" was an unsuccessful experiment.

So much for the first application of a truck to cars, the main facts as to its first application to a locomotive are as follows:

In the *Railroad Gazette* of Jan. 23, 1885, was given a long sketch of the late John B. Jervis by Wm. P. Shinn, C. E. Mr. Shinn, we may add, was a life-long friend of Mr. Jervis, had been selected by him to prepare his biography, had custody of all his papers, and had dictated to a stenographer engaged by the *Railroad Gazette* for that purpose all the leading facts of his life for use in connection with his purpose. The following extracts from this biographical sketch therefore may be accepted as literally correct, and can be readily shown to be:

"Near the close of 1827, Judge Wright resigned [as Consulting Engineer of the Delaware & Hudson Canal Co.], and Mr. Jervis [then Chief Engineer] was appointed to succeed him, and remained in charge of the work until 1830. During this time he constructed the incline of the Carbonade Railroad and ordered from England the 'Stourbridge Lion,' the first locomotive imported into this country, which, with two others, was ordered about a year before the famous trial on the Liverpool & Manchester Railway, indicating Mr. Jervis' extraordinary foresight and courage. This locomotive, Mr. Jervis states, was bought under an order from him for a locomotive which should not exceed 5½ tons in weight. The 'Stourbridge Lion' actually weighed 7 tons exclusive of coal and water, with the proper complement of which its weight was 8 tons, and consequently in excess of the weight which the ties of the Carbonade road were built to sustain, and hence the locomotive could not be used.

"Mr. Jervis subsequently became Chief Engineer of the Schenectady & Saratoga Railroad, and while occupying this position, in 1830, his attention was drawn to the inadequacy of the locomotives of the then existing plan for high speed. This was especially noticeable in the action of the second engine imported for the Albany & Schenectady Railroad, called the 'John Bull,' the first having been named the 'De Witt Clinton.' Mr. Jervis says of the 'John Bull': 'It being placed on four wheels, the overhanging caused a sharp and disagreeable motion of the engine. This circumstance, with others, induced me to continue my researches for a remedy for the weight, and to secure a more steady motion for the engine, and I was finally led to the plan of a four-wheeled truck under the forward portion of the engine as a support for that end.' Mr. Jervis records that his mind was made up in regard to the form of this truck in the summer of 1830, although he had no opportunity to construct an engine of that plan until 1832, when the first engine having one pair of drivers and a four-wheeled truck, manufactured by the West Point Foundry Association, was run on the Mohawk & Hudson Railroad, by David Mathews, till a speed of 50 miles per hour was attained. An engraving in the *Railroad Gazette* for Feb. 3, 1872, shows the engine so designed in 1831. It is scarcely necessary to add that this precise form of truck is now in use on over 125,000 miles of railway in this country, as well as on many thousand miles in other countries."

The engraving referred to was prepared from a drawing furnished by Mr. Jervis, and in an accompanying letter (Dec. 23, 1871), he discussed its origin, mainly as between Mr. Horatio Allen and himself. He says that in the summer of 1830 he and Mr. Allen were together, and discussed the whole matter frankly. Mr. Allen believed in a double-truck locomotive, anticipating what is now known as the "Fairlie" type, and built one the next year, while Mr. Jervis believed in the single truck and prepared the design the next year, and built the engine the year after.

The matter is further explained in some evidence given by Mr. Jervis in the Winan's eight-wheel car case. He stated:

"I invented a new plan of frame, with a bearing carriage, for a locomotive engine in the latter part of the year 1831 for the use of the Mohawk & Hudson Railroad, which was constructed and put on the road in the season of 1832. The truck in this engine worked perfectly; but the boiler, being intended for anthracite coal, did not do well, and another boiler was made for it. Soon after this a second engine, with the same plan of wheels and bearing frame, was made and put in operation on the Schenectady & Saratoga Railroad early in the year 1833. The engine had six wheels, on one pair the driving wheels rested in the usual way on one end of the frame of the engine; the other end of the engine rested on the frame of a four-wheeled car or truck, so arranged that by means of a centre-pin passing through a transverse beam, the upper frame on which the engine rested could follow the guide of the lower frame without necessarily being parallel with it."

As it will presently see the second engine referred to above was possibly the first engine with a truck built by Stephenson. Clearly, however, the first engine truck referred to above was built in America. Zerah Colburn in his "History of the Locomotive" says:

"In July, 1831, Messrs. Robert Stephenson & Co., of Newcastle, sent to the Mohawk & Hudson Railroad an engine—the 'Robert Fulton.' * * * Rather more than a year after it was set to work, the front wheels were removed, and a swiveling truck or 'bogie' was substituted, this truck having been made upon the model of one already in use under an engine—the 'Experiment'—made for the same line at the West Point Foundry, in August, 1832. The 'Experiment,' constructed by Adam Hall, of New York, was the first to which the swiveling truck or bogie was ever applied. This application was made under the direction of John B. Jervis, the then Engineer of the Mohawk & Hudson Railroad."

These accounts fairly agree, and show that an engine with a truck was constructed in America in the year 1832. No such engine appears to have been constructed by Stephenson until early in the following year, 1833. That engine was

* This design is shown in our engraving, Feb. 3, 1872.

† Adam Hall appears to have designed several of the locomotives built at the West Point Foundry, which was situated in New York city.

constructed for the Saratoga & Schenectady Railroad, and from Mr. Jervis' testimony, the truck was made at his suggestion and from his designs. It is, however, very generally claimed in England that the idea of using a truck was suggested at Newcastle in order to overcome the difficulties found in working the rigid wheel base English engines on the curves of the early and roughly laid American lines.

In order to ascertain some of the facts, the writer recently visited the works founded by George Stephenson, and was kindly allowed to inspect numerous old drawings and order books. The entries, however, are very brief, and as every one then connected with the management of the works has passed away, it is often difficult to draw any definite inference from the existing records in the absence of some explanation from any one who was conversant with facts then well known but now forgotten, and which it was then thought hardly needed formal record.

Apparently Messrs. Stephenson built their first bogie engine in 1833. A rough outline of an engine with a single pair of drivers and a four-wheel truck under an inclined pair of outside connected cylinders is lettered:

"First design of a locomotive for the Saratoga & Schenectady Railroad, 16 January, 1833.

"This plan is not quite right in some of the lengths. The dimensions written in are right. Cylinders 9 in. diameter, 14 in. stroke, ports 4½ in. x 1 in."

Some of the dimensions are roughly written, and the method of securing the truck centre pin is sketched in by hand. Apparently the drawing was revised by several different people, the ink and handwriting differing considerably in the different entries. In a book labeled "Description Book, 1831," the following refers to this engine:

"A Locomotive Engine for the Saratoga & Schenectady Railroad. To be finished if possible by the beginning of April. To be in Liverpool by 15 April.

"No. 42. 6 wheels, 1 pair 4 ft. 6 in. diam.; 2 pair 2 ft. 8 in. to go under separate bogie, turning upon a pin in the centre and running upon rollers under the frame.

"Width of railroad, 4 ft. 9 in. Sent away April 6, 1833."

Another book, the Order Book, contains the following entry:

"Ordered Jan. 12. No. 42. Saratoga and Schenectady, 9 x 14, one pair 4 ft. 6 in., 2 bogie 2 ft. 8 in., 6 tons with water. Sent away April 6, 1833."

It will be observed that this engine was built very quickly considering the backward condition of machine tools in those days. To build an engine of a totally new class under three months would appear even now a creditable performance, and was no small feat when we reflect on the disadvantages under which our forefathers labored.

An impression prevails at the works that Robert Stephenson originally suggested the use of the bogie, but it will be observed that neither entries nor drawing throw any light upon the real origin of the idea of placing a bogie or truck under a locomotive. It is, however, certain that as the engine was finished in three months, the time would be insufficient to allow the drawing to be sent to America for approval. The engine was ordered Jan. 12, and the first design with the bogie was ready four days later. This, however, leaves it quite possible that the method of applying the bogie was personally explained to Stephenson by an engineer from the Saratoga & Schenectady.

This engine was named the "Davy Crockett" and was put to work July 2, 1833, making usually two trips (84 miles) per day.

Messrs. Stephenson's books show that three "bogie" engines were made in 1835-36 for South Carolina. These engines were similar in design to the Schenectady engine of 1833, and had 10½ x 16 in. cylinders, outside connected. The one pair of drivers were 4 ft. 6 in. diameter, one pair of truck wheels were 2 ft. 6 in., and the other pair 3 ft. 0 in. diameter. The "bogie" journals were nearly as large as many now running, 3½ x 5. The weight, however, of the engine full was only 15,792 lbs. Five similar engines, with 10 x 15 cylinders, were built for Pennsylvania in 1834. Altogether in those days the locomotive trade between Great Britain and United States seems to have been brisk, and the American demand fully equalled the home business. This was especially the case with "bogie" engines, which appear not to have been built by Stephenson for use in England till some years later. The first engines with trucks made by Messrs. Stephenson for use in England were apparently a lot of engines built for the Vale of Neath (a Welsh coal road), in 1851. The truck was, however, used under many engines on English roads long previous to this. An engine built by Messrs. J. & C. Carmichael, Dundee, in 1833, for a Scotch line, the Dundee & Newtyle, had a single pair of driving wheels in front, driven by vertical cylinders through bell cranks, the rear end of the engine being carried by a four-wheeled truck.

Mr. Theodore West, of Darlington, Eng., states in a paper recently read before the Cleveland Institution of Engineers that "the first English example of a bogie or pivoted carriage to ease the engine round curves" originated in 1830, and that an engine with a truck and apparatus for gripping a middle rail was designed in 1830 by Charles Vignoles and John Ericsson.

It does not appear that this engine was ever built, and a reference to the description and engravings in the patent specification shows that it had no truck.

The term "bogie," used in England in the sense in which we use the word "truck," signifies, in the Tyneside vernacular, a peculiar four-wheeled car still used in that district about collieries and wharves. The body revolves about a vertical pin placed in the centre of the car between the axles. The draught was and is taken from the body, so that in drawing it round a curve, the strain is distributed between

the wheels, and the tendency to throw the wheels across the curve is minimized. The first mention of a similar contrivance applied to railroads operated by power occurs in a patent granted to William Chapman, engineer, of Newcastle-on-Tyne, and E. W. Chapman, rope-maker, of Wallsend, on Dec. 30, 1812. In this patent there is a clear description of a four-wheeled truck. After describing various improvements in the rope-driving gear of a six-wheeled locomotive, in which one pair of wheels is connected rigidly with the main frame, the specification continues:

"The other two pair are fixed on axles parallel to each other to a separate frame, over which the body of the carriage shall be so poised that two-thirds of its weight should lie over the central point of the four wheels where the pivot is placed. * * * The two-thirds weight should rest on conical wheels or rollers bearing upon the curved plates so as to admit the ledgers of the wheels or those of the way to guide them on its curves or past its angles, by forcing the transome or frame to turn on the pivot and thus arrange the wheels to the course of the way similarly to the carriage of a coal wagon. And if the weight of the locomotive should require eight wheels, it is only requisite to substitute in place of the axis *I, I*, a transome such as described, laying the weight equally upon both, and then similarly to two coal wagons attached together, the whole four pair of wheels will arrange themselves to the curves of the railway."

It appears that an engine constructed by Messrs. Chapman on this patent was tried at Lambton colliery, Durham, in December, 1812. It had eight wheels coupled by spur gearing, weighed 6 tons, and drew a load of 54 tons up a grade of 46 ft. per mile at the rate of 4 miles per hour. The wheels of this engine were coupled by cog wheels. Some accounts state that the engine (which is illustrated in Wood's *Treatise on Railroads*, published in 1825) was successful in every particular, while other writers say that the friction of the gearing was excessive.

In the Winans eight-wheel car case tried in Boston in 1853, several witnesses testified that "an eight-wheeled car shown in Tredgold's *Treatise on Railroads and Carriages*, published in 1825, was in mechanical principles and mode of operation substantially the same as the eight-wheeled cars in general use in this country," and Mr. John B. Jervis stated that "Chapman's truck had side bearings, centre pivot and rigid rectangular wheel frame; the Chapman car has more centre surface for the body to rest on than the Tredgold car and in addition has side bearings. In other respects they are alike, both swiveling cars." Mr. Jervis stated that he was acquainted with the drawing of the eight-wheeled car in Tredgold's work at the time it was published in 1825. Mr. John B. Jervis and several other witnesses stated that "a car-builder of ordinary skill and knowledge of his profession would be able to construct the eight-wheeled cars now in general use, in all their essential principles, from Chapman's specifications and drawings, as far as respects the manner of arranging and connecting the eight wheels and the connection of the trucks with the body of the cars."

Oliver Byrne testified: "I saw eight-wheeled cars on the Killineyville & Dalkey Railway in Ireland in August, 1831. * * * They had two four-wheel trucks, which yielded to the curves of the road and were connected to the body by king-bolts or transom-bolts. The principle of construction was precisely the same as the eight-wheel passenger and freight cars now in use in the United States. The eight-wheeled car was called Chapman's car." It was stated on behalf of Mr. Winans that this line was worked by horses, and used for hauling granite, and like the Quincy Granite Railroad was not operated by locomotives for the general conveyance of either freight or passengers.

It appears that the idea of constructing an engine with two trucks was put in practice before the seemingly more obvious plan of placing one truck under the front end of the engine. Mr. Horatio Allen designed some engines for the South Carolina Railroad, in which the boiler and frame were carried on two trucks. Each truck had one pair of driving wheels and one pair of smaller carrying wheels. Each driving axle had a single cylinder working in connection with it. Four engines of this kind were placed upon the South Carolina Railroad in 1832.

An engine with two four-wheeled trucks was built in 1830 for a colliery in South Wales, by Messrs. Fox & Tregelles, of the Neath Abbey Iron Company. The wheels in each truck were coupled by means of coupling rods. The inner axle in each truck carried a spur wheel which geared into a spur wheel on an independent driving shaft, placed midway between the two trucks. This shaft was driven by a pair of steeply inclined cylinders. This engine, which much resembles Chapman's, was one of the first locomotives specially adapted to traverse curves, but as the Neath Abbey Works built solely for local collieries, their engines were never widely known and are now nearly forgotten. Four singular engines of their build, said to have been constructed in 1830, were illustrated in *Engineering*, November, 1867. The valleys in South Wales are very narrow, and crooked, and hence the lines from the coal mines had exceptionally heavy gradients and sharp curves, and it is not surprising that some method of getting considerable adhesion in combination with a flexible wheel-base was soon found to be necessary. Though Chapman originated and these little-known Welsh works continued to build engines with a flexible wheel-base, the extinction of the type they selected proves that their method of enabling an engine to run round curves was not practically successful, being either mechanically inefficient or achieving its object at too great a cost for the advantages obtained.

It would, therefore, appear that the application of a truck to a locomotive was first patented by Chapman in 1812. His engines do not appear to have been very successful or well suited to the needs of the country, and, therefore, fell into disuse, it being probably found better to use the more simple rigid wheel-base engine and heavy rails. Trucks were apparently first used under cars in America in 1829, and

Mr. Jervis appears to have been acquainted with the construction and advantages of the truck, when in 1831 he determined on experimenting with a truck under a locomotive. His application appears to have been successful and well adapted to the light rails and sharp curves of the early railroads of this country. Though it cannot be claimed that Mr. Jervis invented the truck, he deserves every credit for having the mechanical sagacity to experiment with a device which ultimately proved very successful.

The New St. Lawrence Bridge.

A telegram from Lachine, P. Q., says that the masonry of this bridge was completed on Nov. 12, just six months from the time the first caisson was put in place, and only about one year from the time the contract was signed. Contrasting this record, which is certainly in every way most creditable, with that of the Victoria Bridge near by, brings out vividly the great progress which the constructive arts have made in the few years since that now antiquated and—to modern eyes—absurd structure was the pride of this continent.

Contrast of the superstructure of these two great typical bridges would show far more remarkable progress than the masonry record, but while we are not now prepared to enter into such a comparison in detail, we only need to run over a few very general facts to have a very pleasant sense of how much more we know now than did our "forefathers" of 30 years ago—just as our successors of 30 years hence will almost certainly have as respects us, and with far more reason, unless the present increasing ratio of progress in the practical arts should suddenly fall off.

The bridge is in a rapid current of 8 to 12 miles per hour, the greatest depth of water being 90 ft. We published in our issue of May 28, 1886, outline views of the structure, from which it appears that there are 15 spans, aggregating 3,534½ ft., with tops of piers 30 ft. above the ordinary stage of water. The foundations are rock. In all some 4,000 cubic yards of concrete and 7,000 yards of bridge masonry have been built. The season for work on foundations is short, especially as there is an immense amount of running ice in the river after the weather has moderated in the spring.

The contract was let Nov. 1, 1885, requiring that all this great amount of masonry in this difficult situation should be completed by the end of November, 1886, under a forfeit of \$40,000. It will be seen that this exacting demand was fulfilled, with 18 days to spare. Nearly all the stone was cut last winter. The superstructure is to be erected complete during this calendar year.

Contrasting this with the record of the Victoria Bridge, the latter was in process of building from 1854 to 1859 inclusive, or six years. In the first season but one pier was erected; in the next season, but one more; at the end of the third season but nine piers. The whole 24 piers were not completed till the end of the sixth season, although the greatest depth of water was only 22 ft., and the velocity of current only 2 to 8 miles per hour. The total length of the bridge was 6,592 ft., or about double that of the latter bridge, while its cost was about \$6,500,000, against a sum which we are not now able to give exactly, but which is less than \$1,000,000, if we are correctly informed.

Mr. Robert L. Harris, in a recent account of a visit to the bridge, read before the Society of Civil Engineers, in addition to going more fully into the details which we have summarized above, gave a very full account of the work on foundations, which had many interesting features. By a clause in the contract to which Mr. Harris justly took exception, the entire responsibility of the foundations, even to the extent of finding the company's alleged soundings radically imperfect, was thrown upon the contractor; a mode of compelling a contractor "to bet against the Almighty," as one indignant engineer described it with an apology for seeming irreverence, which is too frequently practiced. Fortunately, however, no evil results followed in this case.

Bottomless caissons were built on shore, about 24 ft. wide, and some of them 60 ft. long, inside. They were built with single walls of 12 x 12 timber, rag-bolted together and well calked, with 12 x 12 struts 8 ft. apart horizontally and 4 ft. vertically. Heavy snubbing posts were built into the upstream end, and the caisson towed to its position, anchored, and sunk by loading with railroad iron, some 30 tons being used in cases. In the meantime the material down to rock had been loosened and for the most part removed by dredging or by a stream of water.

The wall of the caisson was cut roughly to fit the bottom, and inside flaps of heavy canvas, rolled on planks, were attached to its bottom. A diver then first packed bags of concrete under the edges of the caisson where space appeared, and then lowered the canvas flaps and loaded them with bags of concrete. More concrete was then lowered rapidly in, about two cubic yards at a time, in a box with a flap bottom, until about all the concrete it was desired to use was in place. The water was pumped out, the concrete leveled off, and after being left exposed a few days, the masonry was started. After the masonry was complete the pier was rip-rapped, inside and outside the caisson, with blocks of about a cubic yard in size. The concrete used was very rich—as concrete ought to be—Portland cement 1, sand 1, broken stone 3.

Just above the piers which stood in the deepest water and strongest current, "turn-water cribs," 32 ft. long, by 8 and 28 ft. wide were sunk, projecting above water. This was found to be far more successful than to attempt to control the crib directly by cables and anchors, as was done at the Niagara International Bridge.

Three steamboats were constantly employed during the construction of the masonry, and over four miles of chain cable and wire rope were used. The details seem simple to describe, but the successful way in which they were worked out and carried through reflects the highest credit on the con-

tractors, Reid & Fleming, who were by their contract in effect made engineers as well as contractors. The Dominion Bridge Company is now rapidly erecting the superstructure. Mr. P. A. Alexander is the Chief Engineer, and the bridge, as we have previously announced, is nine miles above Montreal, at the foot of a wide reach of the St. Lawrence called Lake St. Louis, and is erected in the Canadian Pacific interest. The Lachine Rapids are only two miles below it.

The exports of rails from Great Britain to the United States in October were insignificant, amounting to but 2,948 tons, which is just about equal to the monthly average this year, the exports to this country for the ten months having been 29,375 tons. To other countries the exports in October were 11 per cent. more than last year, but 2.1 per cent. less than in 1884.

The additional reports of October earnings published this week are, five out of the nine, from Southern railroads. All but three report gains, some of them large ones, as 19 per cent. by the Alabama Great Southern, 12 by the Vicksburg & Meridian, and 16½ by the Vicksburg, Shreveport & Pacific. The South Carolina has a minute decrease, but its earnings were unusually small last year. The Northern Central shows a small decrease.

The Northwestern grain receipts continue to fall off rapidly, as is usual at this season, the receipts of these markets for five successive weeks for the last five years having been, in bushels:

	—Week ending—				
	Oct. 16.	Oct. 23.	Oct. 30.	Nov. 6.	Nov. 13.
1886	7,678,042	6,205,393	5,630,270	5,009,630	4,693,557
1885	6,807,013	6,483,256	6,109,869	4,694,883	4,465,008
1884	7,614,388	7,249,709	8,041,509	6,759,107	5,719,496
1883	7,301,910	6,259,317	6,256,619	6,020,850	5,942,156
1882	5,002,729	4,565,201	6,278,640	6,157,189	5,034,019
1881	5,642,568	4,001,019	4,400,918	3,903,642	3,907,872
1880	9,274,351	8,666,749	8,169,032	6,879,584	5,085,595

The falling off this year is noticed more because the receipts previous to the middle of October had been unusually large, while now they are less than in most previous years, and though still larger than last year, only a little larger, while a few weeks ago they were much larger. It is probable that they will soon be smaller than last year, because the receipts then after the middle of November for a few weeks, were extraordinarily large.

For the entire five weeks ending Nov. 13 the Northwestern receipts have been:

Year.	Bushels.	Year.	Bushels.
1880	38,675,000	1884	35,375,000
1881	21,864,000	1885	28,567,000
1882	27,038,000	1886	30,185,000
1883	31,781,000		

The receipts this year were 5.7 per cent. more than last year, but were 14½ per cent. less than in 1884, 5 per cent. less than in 1883 and 22 per cent. less than in 1880.

The Richmond & West Point Terminal Company, which was organized some years ago as an auxiliary to the Richmond & Danville Railroad Company, and which was the agency through which that company obtained control of the Virginia Midland, the Western North Carolina, the Charlotte, Columbia & Augusta, the Columbia & Greenville and some minor lines, has suddenly reversed matters by securing control of the Richmond & Danville Company. Until recently a majority of the Terminal Company's stock was held in the Richmond & Danville treasury, but a few months ago an arrangement was made by which the lines controlled were leased to the Richmond & Danville Company, and the Terminal stock was sold. Most of it was bought by a New York syndicate, who have now concluded the deal by purchasing a majority of the Danville stock for their company at pretty high prices. This is a brief outline of the transaction, all the details of which are not fully known as yet. The control of the system thus passes into other hands, but it does not appear that there will be any material change in the relations of the roads composing the system to each other or to other lines.

The effect of the reduction of fares to 5 cents at all hours on the Manhattan Elevated lines in New York has undoubtedly been a large increase of travel. This is not perceptible so much in what were called the "commission hours" morning and evening, when the fare has always been 5 cents, as at other hours. The increase is especially noticeable in the evening, when the trains, which were formerly very light, are now filled, and indeed crowded at the time when people are going to and from the places of amusement. It might be supposed that a man who can afford to go to the theatre would not stop to consider a difference of 5 cents in his car fare; but that in many cases he evidently does, is very plain to any one who is in the habit of riding on the elevated lines.

At the ordinary business hours not much increase is apparent on the Third avenue line, which has always been crowded. On the Sixth and Ninth avenue lines, however, there is a very evident increase over last year, and on the Sixth avenue about half the trains are now run with five cars. Part of this increase may be taken from the surface lines, but much of it is due to the extraordinary growth of the section of the city west of Central Park and north of Sixtieth street, which has surprised even many old New Yorkers.

As illustrating the great importance of having tie-preserving works scientifically conducted if the results are to be satisfactory, we are permitted to publish the following extract from the report of a Southwestern railroad giving the present results of an experiment now some five years old:

"In reference to the burnettized ties, I doubt very much if there are many of them in the track to-day, they having broken badly and become useless. My impression is that we are principally responsible for this state of affairs, and should not condemn the process in consequence. You will remem-

ber that we used a preparation, I think, of 2 parts chloride of zinc to 48 parts of water, which was entirely too strong, and the timber, as you will also remember, had been cut for a long time and was partially decayed before being treated. This, together with the strength of the preparation, helped to further depreciate the value of the tie, as the fibre of the wood seems to have been, as it were, burnt, and rendered very brittle, resulting in a great number of these ties breaking under pressure and so becoming useless."

A number of prominent lines, both in the East and the West, are now, according to our information, seriously considering the question of erecting tie-preserving plant similar to that at Laramie and Las Vegas, illustrated in our issue of Oct. 29. The addition of the tie spotting and boring machine noted in our last issue is expected to give a material further advantage to the process.

The Eames Vacuum Brake Company has just closed a contract to equip the 44 cars of the Brooklyn bridge with a rather peculiar braking apparatus, required by the special conditions under which the bridge cars are operated. Some months ago, it will be remembered, a serious runaway accident occurred from the fact that when sudden necessity arose to call upon the power brake it did not respond, the reason being simply that the time between trains had been so brief that it had been neglected to charge up the vacuum by the switch engine at the end of the run, as had been the custom. The trains of three cars each now run so close together—about 50 seconds—that it would be physically impossible to charge them at the end of the run.

After considerable investigation and experiment, including successful trial of the apparatus adopted for over six months, it has been decided to put on each car a small air pump, 4 x 7 in. inside, operated by the eccentric on the axle. This works at the slow speed of 110 strokes per minute, and gives an effective working vacuum from atmospheric pressure in a very few revolutions of the wheels. The question of dust, which might elsewhere be so serious, there does not enter into the problem. The air brakes will now be used altogether in place of hand brakes, and considerably increased speed between the run nit of the bridge and the terminus will be possible and will be used, by letting go the grip much sooner than heretofore. By a simple interlocking arrangement the grip must be released before the air is put on.

We are informed that the Eames Vacuum Brake Company now intends to equip the 50-car train with which they will enter the April, 1887, Burlington freight brake tests with the Boston automatic car coupler, one of those of the "vertical plane" type recommended by the Massachusetts Railroad Commission. The Westinghouse train will be equipped with the Janney coupler.

The Springfield Republican of Nov. 22 says:

"The wrecking of the engine of a western express train at night at Pittsfield and of another engine on a freight train with which it came in collision is a startling illustration of the necessity for sleepless vigilance in train and track service. The blame is laid on a 'small boy,' bringing a brakeman's diener, who meddled with a switch. The question is, how many switches does the Boston & Albany leave exposed to the small boy between Albany and Boston? If this is the true state of the case, the accident was disgraceful to the road. Fortunately the air-brake had nearly stopped the passenger train or there would have been terrible results—one of those fearful affairs which are called 'accidents,' when they might much more truly be called exposures or experiments in design."

Here we have still another collision which may almost come under the class headed "nobody to blame." But still there is one little loophole (or a big one) which leads one to be cautious about accusing a "mysterious Providence" of too many wrongs. It appears the switchman, who was near by, was in the habit of sub-letting his duties to the boy in question, and it is alleged that the latter only made the slight mistake of turning the switch (facing point) a minute before the train, instead of a minute after, as he had been told to do. Strictly speaking, the chief dereliction on the switch-tender's part was the leaving the switch unlocked, and turning his eyes away from it when a fast train was due. A derailment from a similar cause occurred on the same road a few years ago, when a boy who thought he was directed to turn a switch, let a heavy express train on to the ground in the depot at Springfield, turning the switch (stub-rail) when the engine was almost upon it.

"A stitch in time" will have to be amended to read one stitch in time, etc., with a big emphasis on the one. Very likely the Pittsfield switchman feels badly abused to think that he must suffer when he took all proper precautions except one, and that "a very little one." But the *Republican* has other grounds on which to rest the justice of its verdict. The simple device of a tower, even without interlocking, would have prevented this bump, by having the switch levers grouped in a building, instead of scattered outdoors where a lazy switchman will be tempted to avail himself of boy help. Where switching work is of not enough importance to require the constant attendance of a man at one point there is perhaps reason for not introducing interlocking, but the scene of this collision is near a divisional terminus where a regular switchman is employed. But again, the ordinary switch target at this place is said to be not very high, not very large and rather dirty, and moreover stands close to a dingy abutment and is sometimes shaded by the bridge overhead, so that on a road much poorer than the Boston & Albany there would still be room for criticism. Large and high targets certainly do not cost much, and if the crop of red and white paint does not ripen as fast as the switches become dirty a little strong soap-suds surely can be afforded by anybody. The best of runners ought not to be placed at a disadvantage where so little improvement would so greatly help him, and where the runners are partly of the second best grade, "accidents" may be regarded as certainties sooner or later.

The switch in question is included in an automatic track circuit of the Union Switch and Signal Company's system, but there is no device for keeping a clear road after notifying the engineman that he has one. It is virtually a distant signal without a home signal; and no electric locking. The boy is said to have turned the switch after the engine passed the signal.

It might be said that, with air brakes and other efficient safeguards, lapses like this would generally result in no more harm than this one did; in short, that so small a bill of damages is a poor text for so long a sermon; but it is to be remembered that a road with so high a reputation for safety as the Boston & Albany has is as much injured by a little accident like this as some roads would be if they killed a passenger or two.

In reference to the question of steam heating, brought so prominently (and it is to be hoped, effectively) forward by the Rio disaster, a correspondent of the *American Engineer* gives the following account of an interesting experiment which seems to show that there is nothing serious in the objection sometimes made to the use of steam for heating cars, that there is danger of scalding in case of rupture of the pipes:

"I have been experimenting to determine a point upon which you touch and about which a few others have also expressed fears, namely, the danger of scalding by steam in case of breakage of pipes. Prompted by your article I had a car drawn out, engine attached, 20 lbs. of steam applied and the car warmed; then the doors and windows were closed and I unscrewed an inch plug. As the plug flew out a report like a young cannon was made. I stood beside the outlet and let the car fill with steam until it was impossible to see an inch away. I walked from end to end of the car and called others in to examine. There was no heat 6 in. from the outlet of the pipe, nor any difficulty about heat or breathing. In fact all the effect was to dampen my clothing, something as a mist would."

We learn on inquiry of the Superintendent of the Connecticut River Railroad that the floating paragraph which we gave last week, on the heating system by live steam from the locomotive in use on that road, in which it appeared after five years' testing that the system was in perfect working order on twenty trains, gives rather too rose-colored a view of the situation. On the short trains in use on that road it works very well, but improvements of detail are still making in the apparatus.

There are, however, at least two other systems which are in successful practical use on a considerable scale, one of which we have recently illustrated, and the other we hope to illustrate shortly, and perhaps there are still others which we do not recall, from which a choice can be made. While the expense of a change is considerable, yet it is possible that there may be in the end a considerable money saving, as well as saving of life, from eliminating fire on cars altogether, and relying either on steam from the locomotive, or from a separate boiler in the baggage car, if the locomotive cannot spare the steam. For the cost per car of fuel for heating is, if we are correctly informed, from \$40 to \$60 or \$70 per car, to which must be added something for attendance and repairs, whereas a mere fraction of this cost, burned on the locomotive, would, or ought to, furnish the same amount of heat, owing to the more effective way of obtaining it from the coal. This, we are assured, is the result of experience, for we have recently learned from the master mechanic of a road which has had one of these systems in use for several winters with conspicuous success, that the steam taken does not result, so far as can be detected, in any measurable increase in the fuel consumption. It may be readily determined that only a very small percentage of the steam generated by the locomotive can be required for the longest train, by comparing the average consumption of the locomotive per mile and per hour with that needed to heat a car. And when we further remember how very large a proportion of the time of the fastest trains is spent standing still at stations or running at slow speed, and that for much more than half of the remaining time they are running down hill or on a level, we see further reasons why the alleged difficulty of sparing the steam from the engine may be more imaginary than real.

The accident on the Pan-Handle, on the 18th inst., almost within the city limits of Pittsburgh, by which the limited express was suddenly loaded up with rocks and stones, to the serious injury of eight persons and the great terror of all the rest, is another illustration of the fact that there is a certain large class of railroad accidents which, in a practical sense, may fairly be said to be beyond the reach of cure. The piece of track on which the accident occurred was graded, if we mistake not, in 1854. It has therefore braved the storms and frost and thaw of 32 years successfully, and the most exacting officer could hardly blame the roadmaster in charge for beginning to feel that it was "permanently all right," and perhaps relaxing his vigilance. Of course there may have been circumstances during this time to excite suspicion of the bluff, or even premonitory symptoms of what was coming which a vigilant eye might have detected, but we presume not, for the usual rule with such land-slides is that they give no surface warning whatever of what is coming, so that the only way to guard against them perfectly is to cut away all slopes to so flat an angle that land-slides are impossible. But that would involve expenditures running far up in the tens of millions for cutting away points where there was not the slightest real danger. It is just as in laying out culverts; we can lay them out so that nine out of ten, to put it mildly, will never wash out, at reasonable cost, but to lay them out so that none of them should ever wash out is simply impossible, without doubling or trebling their cost.

Mr. H. T. Gallup, who has just been appointed General Superintendent of the Boston & Albany Railroad, has had long

experience in various departments, though he is still a young man, in appearance at least, and comparatively so in years. He began on the old Boston & Worcester in 1855 as brakeman, rising gradually to passenger conductor, from which he was transferred in 1875 to the freight agency at East Boston, an important point, where all the export and transfer business with the European steamers is done. In 1880 he was made Assistant General Freight Agent, and in 1884 General Freight Agent, on the promotion of Arthur Mills to the office of General Traffic Manager. Mr. Gallup has thus had opportunities to widen his acquaintance and information, qualifying him as a valuable servant for his employer, while at the same time his long service in subordinate positions has made him exceptionally well acquainted with the surroundings and with the men of his own road; thus fitting him to become an officer who, in dealing with his thousands of subordinates, will not be out of sympathy with them. Mr. Gallup, when he began his railroad career, was not perhaps better equipped, mentally, than the average young man entering the service at that time, but in marked contrast to the habits of many railroaders in the ordinary grades, he made good use of his spare time, becoming, we understand, quite well acquainted with several foreign languages before he left his conductorship. This is but another illustration of the fact that industry and perseverance do "count," and that it is well not to neglect them when making calculations.

For the third time in its short history the Mexican Central Railroad, according to the telegraphic reports, has made a general "clean-out" of its passenger conductors, some 60 conductors and 20 agents in supposed collusion with them having been discharged on this occasion; a much larger number than ever before, simply because the business of the road is now greater, but much the same in substance as the previous ones.

Of course such discharges must come, and cannot come too soon, when the necessity has arisen, but to hope to cure it merely by putting in new men is hoping against hope. If there is anything as to which the teachings of experience are clear, it is that the honesty of but few men can stand the strain of having large sums of other people's money passing through their hands without some effective check upon what they do with it, and justice to the tempted as well as to those who suffer by their weakness requires that there should be such checks, nor will the honest man object to, but rather welcome them.

Mr. Clark Fisher calls our attention to the fact that the apparent "conflict of veracity" as to who picked up the West Shore cinder illustrated in our issue of two weeks since may be thus simply explained: On another road than the West Shore, and last summer only, instead of two years ago, he picked up a similar "cinder," which was made the subject of comment, and hence, by a succession of chances not necessary to specify, the two became confused.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Americus, Preston & Lumpkin.—Extended from Lumpkin, Ga., southwest to Antioch, 10 miles.
Aniston & Atlantic.—Extended from Sycamore, Ala., to Syllacanga, 6 miles.
Chesapeake & Nashville.—Track laid from Gallatin, Tenn., northwest twenty miles, an extension of 9 miles.
Chicago, Rock Island & Pacific.—The Chicago, Kansas & Nebraska line is extended from Troy, Kan., west to Denton, 21 miles. Track is also laid from Fairbury, Neb., east and west 30 miles.
Florida Railway & Navigation Co..—A belt line has been completed at Jacksonville, Fla., 1½ miles long.
Helena & Red Mountain.—Extended to Red Mountain, Mon., 10 miles.
Missouri Pacific.—The Council Grove, Osage City & Ottawa Branch is extended west from Admire, Kan., 16 miles. The Topeka, Salina & Western Branch is extended from Chico, Kan., west 127 miles.
Omaha Belt.—Track laid from Omaha, Neb., southward to Papillion, 14 miles; also around Omaha about 6 miles.
Prescott & Arizona Central.—Completed for fifty miles southward from Prescott Junction (Chino), Ariz., an extension of 30 miles.
St. Louis, Fort Scott & Wichita.—The Newton Branch is extended westward to McPherson, Kan., 17½ miles.
Sanford & Lake Eustis.—Extended west to Sorrento, Fla., 3 miles.

This is a total of 301 miles on 12 lines, making 5,971 miles reported so far this year. The new track reported to the corresponding date for 15 years has been:

Miles.	Miles.	Miles.
1886..... 5,971	1881..... 6,983	1876..... 2,153
1885..... 2,439	1880..... 3,443	1875..... 1,176
1884..... 3,425	1879..... 3,263	1874..... 1,731
1883..... 5,717	1878..... 2,126	1873..... 3,436
1882..... 9,255	1877..... 1,964	1872..... 6,559

This statement covers main track only, second or other additional tracks and sidings not being counted.

NEW PUBLICATION.

Pocket-Book of Tables and Formulae for Railroad Engineers, embracing also Tables and Formulae for running in Transition Curves. By B. H. Hardaway, A.B., B.E. & F. N. Spon, New York.

The typographical form of this field-book is something of a novelty in that it is designed to be used in very convenient fashion in direct connection with field note-books prepared for the purpose; the back cover of the field-book slipping into

a pocket on the inside of the back cover of the note-book, the latter being bound so as to leave space for it.

The field-book is a thin one of 48 pages and has its good points, but also the very bad one that, while giving much that is not at all essential for a transitman to have immediately under his thumb in the field, it omits many formulae for shifting curves and similar purposes, which it is very desirable that he should have immediately accessible. This defeats the end of a publication which would otherwise be quite likely to commend itself to general favor. We have been quite unable to understand the principle of selection.

The method for running in transition curves is more convenient than in most of the other published methods for that purpose, but it is too inelastic as respects the length of the curve, and anything but clearly explained.

TECHNICAL.

Locomotive Building.

The Pittsburgh Locomotive Works, in Pittsburgh, Pa., last week delivered two ten-wheel freight engines, with 19 by 24 in. cylinders, to the Cape Fear & Yadkin Valley road.

The Rogers Locomotive Works in Paterson, N. J., are running with a large force, having several orders on hand.

The Car Shops.

The New York, Lake Erie & Western Co. has lately placed a number of large orders for freight equipment in its own shops, which will be run to their full capacity. The Buffalo shops will build 250 hopper bottom gondolas, the Meadville shops 100 box and 10 caboose cars, the Kent shops 150 box cars, and the Jersey City shops 10 milk cars. The new box cars will all be of 25 tons capacity.

The Litchfield Car Co. in Litchfield, Ill., has received an order for 200 box cars for the Texas & Pacific road.

The New York Central Sleeping Car Co. is to build some large additions to the shops at Buffalo.

The Fowler Steel Car Wheel Co. is building shops in Chicago for the manufacture of the Fowler patent solid steel wheels.

Bridge Notes.

The Vermont Construction Co. in St. Albans, Vt., has taken a contract for two iron bridges on the Brattleboro & Whitehall road.

The Edgemoor Iron Co. in Wilmington, Del., has taken a contract for an iron bridge at Danville, Va., the contract price being \$84,000.

Manufacturing and Business.

The Gold Heater Co. has taken a contract to put its heating apparatus in 19 cars for the Long Island Railroad. The Martin Anti-Fire Car Heater Co., of Dunkirk, N. Y., is fitting up a train on the same road with its heating apparatus.

The American Brake Co. is enlarging its shops in St. Louis by extending the second floor to make room for a brass shop; the additional space gained on the lower floor will be filled with machinery.

The Cuyaboga Works in Cleveland, O., have just shipped a blowing engine to the Roane Iron Co., Chattanooga, Tenn., for their new Bessemer plant. The steam cylinder is 38-in. bore, 54-in. stroke; air cylinder, 54-in. bore, 54-inch stroke. The engine is very heavy and substantial.

The North Star Iron Works in Minneapolis, Minn., have secured the contract for a pair of pumping engines, 300 H. P., for the Minneapolis water-works.

The Wainwright Manufacturing Co., of Boston and New York, reports increased inquiries for its corrugated tubing from railroad men who are beginning to appreciate the advantages claimed for that tubing in the way of increased strength, greater surface and allowance for expansion and contraction.

Iron and Steel.

The Lookout Iron Co. in Chattanooga, Tenn., has begun the manufacture of wrought iron pipe, having completed the erection of a plant with a capacity of 36 tons a day.

The Pulaski Iron Co. has been organized by Philadelphia parties to build a blast furnace at Pulaski, Va., on the Norfolk & Western road.

The South Pittsburgh Coal & Iron Co. will build two blast furnaces at South Pittsburgh, Tenn. Mr. A. S. Colyar is President.

The Roane Iron Co. has a large force at work on its new Bessemer steel plant in Chattanooga, Tenn., which will be in operation in January.

The Chicago Forge & Bolt Works in Chicago report a large business, chiefly on railroad orders.

The Schofield Metal Cross-Tie Co. has been organized at Chattanooga, Tenn., by J. Schofield, E. M. Schofield, H. W. Grant and G. W. Chapman, to build a rolling mill and make railroad ties of iron or steel.

The Jupiter Iron Co. has made contracts for extensive repairs and improvements in its Jupiter Furnace at South St. Louis.

The Rail Market.

Steel Rails.—Quotations are steady at \$34.50@35 per ton at Eastern mills, with no disposition to shade prices, and ordinary rails can hardly be placed below \$35.

Rail Fastenings.—Quotations are steady at 2.40 cents per lb. for spikes in Pittsburgh; there has been some talk of an advance, but none has yet been announced. Track-bolts have advanced and are quoted at 2.90@3.10 cents per lb.; splice-bars at 1.80@1.90.

Old Rails.—Old iron rails are firm, and are quoted at \$22@23 per ton at tidewater. Old steel rails are scarce, and are quoted at \$24@25.50 per ton in Pittsburgh.

Car Lubrication.

At the last meeting of the Engineers' Club of Philadelphia, Mr. W. E. Hall presented a paper on Car Lubrication, the following summary of which is given in the proceedings of the Club:

What will be the result of the many attempts to improve the present condition of car lubrication, and to overcome some or all of the various annoyances—particularly that of the heating of journals and brasses—which are now connected with this important part of the transportation and motive power departments of railroads, is a matter of great interest.

The distinction between good and bad lubrication is simply a comparative one. Efforts should always be directed toward reducing the frictional resistance and wear of journals and bearings, upon which, with the quantity and quality of lubricant required per car per mile, depends the economy of the results.

The method of lubrication which is now used for passenger and freight car journals is somewhat imperfect at its best, and much more so as carried out in railway work. The principle of its action is that the material used in the boxes—whether fibrous, cotton or woolen waste—is of such a nature as to retain the oil, and, it is claimed, to draw it from the bottom of the oil-box to the journal with which the waste is in contact.

From the manner of attending to car oil boxes, it is found that the waste, from the frequent, but small, supplies of oil which it receives, does not reach its best condition—that is, become thoroughly saturated in the upper part, or that next to the journal, and able to retain a larger percentage of oil—until after it has made considerable mileage, and then it is that the lubrication of the journal obtained by this method is the most efficient. New waste, when put into boxes, will always make the journals reach a higher "running heat," which, although advantageous in increasing the fluidity of the lubricant and, therefore, decreasing the co-efficient of friction, is yet objectionable in reducing the condition of lubrication to a more sensitive one, and one more likely to influence the production of hot journals. For this latter reason a low "running heat" of say 75 degrees Fahr., while giving somewhat higher frictional resistance, is preferable. It is always advisable to saturate new waste as thoroughly and as long as possible before placing it in car boxes, and to use waste, when repacking, that has seen more or less service, provided it does not contain sand or grit.

It will, then, be noticed, in the present method of lubricating car journals, that immediately after the box has been oiled the top of the waste is well saturated and all in good condition; but, in a short time, the waste in contact with the journal will lose what oil it may contain, by its falling to the bottom of the box, dissipation and leakage at the mouth and back.

While the box may contain abundance of oil at the bottom, the top of the waste, where it is desired the oil should be, is comparatively dry and inefficient. In this particular a mixture of woolen and cotton waste—about half and half—is found to give better service than either used alone. The woolen waste has the elasticity, and the cotton waste, while not absorbing as well, seems to keep the oil in the desired position better than the former. This is due to the cotton waste packing closer and tighter than the woolen waste.

Reliable experiments of Mr. Tower have shown that, with the several methods of lubricating, the comparative frictional resistances are:

Oil bath.....	1.00
Pad saturated with oil under and in contact with journal....	6.48
Siphon lubricator.....	7.06

A consideration of these results, and their application to car lubrication, will follow at some future meeting.

Engineers' Club of Philadelphia.

A business meeting was held at the Club House in Philadelphia, Nov. 6, President Washington Jones in the chair.

The Tellers reported the following gentlemen elected active members: G. D. Chenoweth, Amasa Ely, A. E. Harvey, Jr., Wm. D. Hewitt, Arthur Marichal, Albert Millett, H. A. Schofield, Louis S. Wright.

The Secretary presented for Mr. W. E. Hall an elaborate paper on Car Lubrication. This was discussed by Prof. L. M. Haupt, Mr. John T. Boyd and others.

Mr. Frank A. Hill presented a paper upon Accidents in Anthracite Coal Mines. He stated that the proportion of fatal accidents is not increasing. For the six years 1875-80 there was an average of one person killed to 98,692 tons mined; for the five years 1881-85, the average was one killed to 105,879 tons mined. Roof-falls, fire-damp and careless handling of powder cause at least 60 per cent. of the accidents; fully 90 per cent. are due to carelessness.

The Secretary presented, for Mr. George R. Henderson, a paper on the Efficiency of Locomotives and Resistance of Trains. The efficiency of locomotives depends, first, upon the proportions of the engine, and second, upon the grade, curvature, etc., of the road. From the proportions, etc., of the engine we can determine the effective tractive power, and then, taking the proper formulae for resistance on grades, etc., and equating the two, we derive an equation by the resolution of which we obtain the necessary values to determine the load a given locomotive will haul on a certain road, or the load being known, to proportion the engine. These formulae and tables are given in the paper.

The Secretary presented, for Mr. Herman Haupt, Jr., a description of the St. Paul Ice Palace, illustrated by photographs and prints.

A New System of Manufacturing Metal Tubes.

An account of a remarkable system of making copper tubes, illustrated by specimens of the work done, was given at the recent meeting of the British Association by Mr. James Robertson, of Glasgow, in a paper read by Mr. Ralph Heaton, of Birmingham, in whose works the system is adopted. Mr. Robertson calls the principle involved in his system the "cross surface motion frictional contact of solid bodies." The essential feature is the application to tube-drawing mandrils of the compound motion which any one gives to a cork when it is pulled out by a slightly twisting movement, or of the partial rotative movement given to, say, a wheel, when it is being pushed on to a shaft upon which it fits tightly. The same principle had previously been employed by Mr. Robertson of a means of making pistons and piston and slide rods move more freely than when the pull or push imparted to them caused them to move only in the direction of their axes and not to rotate upon them. The same principle has recently been employed by Mr. Wicksteed for the rotating pistons in his autographic testing apparatus. The difference between the force necessary to slide a gland along a rod when the rod is fixed and when it is rotated at a hundred or so revolutions per minute, has been found by Mr. Robertson to be something like 60 times, and the force necessary to pull a bulb-ended mandril through a tube is said to be from 60 to 80 times more when pulled in the ordinary way than when rotated at the same time that it is pulled. The greatest saving of power seems to be effected when the movement is in a rotative sense of the surface concerned is about equal to its linear axial advance. The rotating mandril has been adopted for drawing welded tubes, and it is found that by rotation the mandril is at the same time prevented from heating to any material extent, and that a tube which previously required two heats can now be made in one. This causes a saving in mandrils, and we are informed that the higher the speed the less the heating of the mandril for given work, and a mandril of proper form if rotated at about 4,500 turns per minute may be forced through a white-hot billet of steel 1 ft. in thickness so rapidly that the mandril may be held in the hand when withdrawn.

The application of the invention of Mr. Robertson has been developed in the works of Messrs. Heaton, of the Mint, Birmingham, where cast copper ingots are made direct into thick "shells" for large or small tubes. The ingots are from 4 in. to 7 in. diameter, and by means of a small mandril a hole may be, and often has been, forced into one of these smaller sizes; but by making a small hole through in the first instance in a special machine, the mandril enlarging the hole from, say, 1 in. to 3.5 in., may be pushed through the ingot at the rate of from 6 in. to 9 in. per minute, and even a foot per minute, a current of oil being maintained through the hole and the mandril rotated at about 20 revolutions per minute and pushed with a pressure of about 50 tons.

The mandrils are rotated in the opposite direction to that which would be necessary if they were rimers. They are made of steel, and for the larger sizes ordinary Bessemer steel is found to be the best adapted for the work and to stand the hardening.

This process is in course of development, and will no doubt work some great changes in the present methods of tube mak-

ing. It is exceedingly interesting as a metallurgical process, and would have delighted Tresca could he have seen it. As may be expected from what we have said as to the rate at which the copper ingot has to make up its mind to change its form, a hard and bad ingot will not stand the first process, but those which do stand it—and they are nearly all—have thereafter a comparatively comfortable time in the succeeding drawings which follow the annealing after the first. The surface sometimes shows that the ingot has been heavily dealt with, but a light cut is run over the shells in a lathe at a high speed, and this surface defect, when it exists, is removed at very low cost, and the result is that splendidly sound and strong copper tubes are the result, especially adapted, owing to the way in which the metal is compressed, for calico printing rolls, as well as for the purposes of large and medium size copper pipes for general steam purposes.—*Engineer.*

Charcoal Iron Workers.

The seventh annual meeting of the United States Association of Charcoal Iron Workers was held in Philadelphia recently. A very fair representation of the membership of the Association was in attendance. At the first session, Mr. John Birkinbine, the Secretary, read a paper on the Gogebic iron ore region of Lake Superior. On the following day the members and invited guests took an excursion to Chester, Pa., Wilmington, Delaware, and Northeast, Md., a special train having been furnished them by the Pennsylvania Railroad Co. An evening session was held, at which the principal business transacted was the reading and discussion of a paper on the microscopical examination of charcoal and coke pig-iron by Dr. Herman Wedding, of Berlin, Germany. On the third day the Association attended to routine business, re-electing Mr. J. C. Fuller, of Philadelphia, President, and Mr. John Birkinbine, of the same city, Secretary and Treasurer. Messrs. W. R. Davenport, of Erie, Pa., O. W. Davis, Jr., of Maine, and W. H. Lee, of Missouri, were elected Vice-Presidents. In the afternoon the members visited the establishments of A. Whitney & Sons, car-wheel manufacturers, and the Baldwin Locomotive Works. In the evening they participated in a banquet in the assembly room of the Union League, which was tendered them by the iron trade of Philadelphia; speeches were made by Judge Kelley, Mr. James C. Bayles, and others.

The Manhattan Elevated Locomotives.

The *American Machinist* states that the Manhattan Elevated Co. is adopting solid brass driving boxes for its locomotives. There being nothing to shake loose in the box, the cost of repairs is reduced, and slightly larger axles can be adopted without altering other parts. Iron cabs have been found to do well and are replacing the wooden cabs. A Belpaire fire-box is soon to be tried on one of the locomotives.

A Device to Drain Locomotive Cylinders.

Mr. William McKenzie, General Foreman of the New York, Pennsylvania & Ohio Railroad machine-shop at Meadville, has invented a device for ejecting water from the cylinder of a locomotive; it is described as follows: "The steam ports on either side of the locomotive are connected with a small pipe, to which is attached an automatic valve directly back of the saddle. When the locomotive is under steam pressure this valve remains closed, and opens the moment the pressure is shut off, thus allowing every drop of water that has accumulated in the ports to escape."

A Great Spouting Oil Well.

The Russian newspapers contain a telegram from Baku announcing the greatest outburst of oil ever known. It runs thus: "Baku, Oct. 5.—At Tagieff's wells a fountain has commenced playing at the rate of 30,000 pounds (1,084,000 lbs.) of petroleum an hour. Its height is 224 ft. In spite of its being three miles from the town, the petroleum sand is pouring upon the buildings and streets." The champion petroleum fountain up to now has been the "Droobha," which in 1883 spouted to the height of 200 or 300 ft., at the rate of nearly 3,300 tons of oil a day.

Improvements of the Niagara Suspension Bridge.

A correspondent of the *Buffalo Commercial Advertiser* thus speaks of improvements now in progress at the Niagara Suspension bridge:

"The original anchors were strengthened by sinking deep pits at either end of the bridge, and extra anchors were added help sustain the heavy structure. The stone towers on which rest the huge cables were watched with great care, and new stone was added to any spot showing the slightest weakness from decay. It was finally decided that not only for symmetry and beauty, but for durability also, it would be better to substitute steel towers for the stone ones. The contract was let some time since and work was commenced. The stone towers were chiseled down to such a point that the steel when put in place would occupy about the same space. There was some delay in concluding the operations, but the work is now fairly under way. The iron is being placed in position, and before many weeks the old suspension bridge will be practically a new bridge throughout. The towers are to be built and secured before any part of the transfer of the cables will take place. Then by means of hydraulic jacks the cables are to be lifted slightly and placed upon the steel towers, after which the old stone work will be torn down. The operation is an interesting one, and is under the charge of Engineer Burk. It will be necessary during the last treatment of this operation for Grand Trunk cars to pass over the Cantilever bridge, and it is understood that arrangements have already been made to that effect."

Doing Away with Highway Grade Crossings.

The annual report of the Old Colony Railroad Co., just issued, says: "During the year much attention has been given to the removal of grade crossings. Four highway crossings in Hingham have been discontinued. Two highway crossings in Middleboro have been avoided by the construction of a new highway. Three highway crossings in Kingston and Plympton have been carried over the road by two overhead bridges, and two crossings in Leominster have been replaced by a single highway protected by gates. The cost of these improvements, by which the number of level crossings of the track has been diminished by 10, has been \$11,470, with some claims remaining unsettled. Probably no expenditure can be made upon the road more profitably for the company, than in the abolishment of these grade crossings. There are several others upon which the work has been commenced of substituting overhead bridges for level crossings."

Railroads in Queensland, Australia.

The Queens' and Government is about to try 4,000 steel sleepers on portions of their lines where timber is scarce and white ants are plentiful.

A debate, lasting four days, took place in the Legislative Assembly on a motion that the Government should encourage the manufacture of locomotives and rolling stock in the colony, but as it was pointed out that the difference in cost would be over 20 per cent., the motion was lost. It was stated that since 1876 the Government had imported all locomotives; 125 from England, costing \$1,263,000, and 52 from America, costing \$280,000. Three tram motors had also been imported from England at a cost of \$19,000. Had they been manufactured in the colony \$1,040,000 would have

been paid for labor. The largest engines had only 13 in. cylinders, and cost delivered in the colony \$10,000 to \$11,000. Twelve firms in the colony were engaged in the manufacture of rolling stock and one firm was making extensive additions to its plant in order to build locomotives. A firm at Ballarat which built for the Victorian Government had received \$15,000 each for 18 in. cylinder engines.

The Wooten Engine.

The style of fire-box invented by Mr. J. E. Wooten appears to be in increasing use, and the following figures show the number of locomotives with this fire-box built by the Baldwin Locomotive Works. This firm built the first Wooten fire-box engine in 1880.

	Philadelphia & Reading.	Other companies.
1880.....	18	5
1881.....	30	10
1882.....	30	..
1883.....	28	..
1884.....	24	2
1885.....	3	3
1886 (to date).....	10	43
Totals.....	140	63
Whole total.....	203	

Of this number 24 were to burn bituminous coal, and the remainder anthracite.

Many engines with the Wooten fire-box have been illustrated in the *Railroad Gazette*, and one of the latest and largest engines built on this plan, the "Kitchigami," was illustrated and described in our issue of Jan. 22, 1886.

The First Locomotive Pilot.

Mr. L. B. Davies, of Columbus, O., gives the Cincinnati *Commercial Gazette* the following account of the first pilot or cowcatcher used on a locomotive:

"Several years after the beginning of my connection with the Little Miami, the Columbus & Xenia Railroad was opened, and I was given a position, and Mr. Sylvester Medberry, who was the Superintendent and Civil Engineer of that road, gave me the position of Master Machinist in the shops at Columbus. I think that was in 1853. In addition to my shop duties I often had to run a locomotive, being, in fact, a sort of head engineer. At that time, as all old railroaders will remember, the only pilot or 'cowcatcher' in use on locomotives was a row of iron spikes about 4 ft. long and placed about 1 ft. apart 1 ft. above the track, the structure being made fast to the bumpers of the engine. This structure I never liked, as while running on the road I had several disagreeable and dangerous experiences in connection with it. Once we caught a cow on one of the spikes in the night time between Springfield and Spring Valley. The spike entered under the fore shoulder and dragged her over the ends of the ties until we reached the Spring Valley water station, where we discovered what had happened. Nothing remained of the animal but her head and shoulders. In those days we had no headlights on the locomotives, and no part of the road was fenced in, so that running over stock was a nightly occurrence. Old and decayed trees standing near the track were often blown across it, and made travel very dangerous, as I found to my sorrow on one occasion. One stormy night on our down trip, when I was on the Little Miami, we ran into a fallen tree near Snively's, a wood station a few miles below Xenia, and I was thrown from the engine into a woodpile. Both my legs were broken, and I was otherwise severely injured, so that, even at this late day, I often feel the effects of that fall. In this day it is customary to sue the railroad company for heavy damages in such cases, but then we took all such things as incidents of the trip. But with all the wooden rails and other crude equipments we had but few accidents, and but one really serious. That was the crippling for life of an engineer whose train collided with another, but he and his family were well cared for by the company, and are to this day, so far as I know, for they were when I last heard from them. These things set me into a constant train of thought as to how I would improve the pilot, which could not be used long as it was then constructed. One day, with my mind running in this channel, I noticed a farmer plowing in a field near the railroad and the manner in which the mold-board of the plow threw the earth to one side caught my attention and gave me an idea which finally developed into the plan of the modern cowcatcher. It seemed just the thing for a locomotive, except that it was one-sided, and I soon came to the conclusion that this could be remedied by putting together two structures like the mold-board which I did, making a cowcatcher exactly like every one used in the United States to-day. The first one made was put on the locomotive 'Paterson,' of the Columbus & Xenia road, and on the first trip Superintendent Medberry accompanied me. On the down run we went through a flock of cattle and they were thrown to right and left so beautifully that Mr. Medberry immediately approved the arrangement and ordered that every engine on the road be provided with a cowcatcher, which was done as soon as possible. On one of my trips to Xenia, Mr. Clements, of the Little Miami, told me I ought to have had the invention patented. I think so now myself, but at that time I was so busy that I could scarcely get a whole night's sleep, there being only four engines on the road to do all the work. I have never received a dollar's benefit from the invention—not even a free ride on the old road—although I could have had that if I asked for it while the road was in the old hands."

Bridge-Building in Four Western States.

In the list which we have prepared we have endeavored to present in its simplest form an accurate record of the progress of iron bridge building on public highways during 10 months of 1886, in the states of Missouri, Illinois, Iowa and Kansas. The compilation specifies the names of the towns at which lettings for iron bridges were made, together with the names of the states, and the amounts of the contracts severally and collectively, under monthly headings. No effort has been made to gather and include data relating to private lettings for iron bridges; nor have combination bridges of wood and iron been taken into account. From authority which may be deemed trustworthy, however, we feel warranted in placing the amount of private contracts for iron highway bridges in the four states named at \$150,000, and for wooden bridges at \$100,000. These figures are approximations which a thorough canvass of facts might alter, either one way or the other, but certainly to no marked extent.

Our footings make the aggregate of public contracts awarded for iron bridges \$731,089. This has been contributed by the four states in amounts as follows: Missouri, \$167,891; Illinois, \$162,799; Iowa, \$257,660; Kansas, \$142,739.

The statistical position of the bridge-building business we have not attempted to compare with last year; approximately there has been a gain of 40 to 50 per cent. in the total amount of lettings. If this estimate seems extravagant it is because the fact is not considered that bridge-building material, especially iron, has been steadily advancing in price, and has affected all new contracts.

For next year the prospects for bridge-building are extremely favorable, since it always follows that active railway construction emphasizes the necessity for more highway bridges. In a single county in Kansas through which the

first railroad will be laid this winter, or next spring, no less than 30 bridges will be required to keep open wagon roads to shipping points.—*St. Louis Age of Steel*.

Trial of a Locomotive-Type Compound Engine.

The *Mechanical World* gives an account of a careful trial made lately of a stationary compound non-condensing engine with a locomotive-type boiler. The engine was built by Davey, Paxman & Co., of Colchester, England, and had been working regularly to its utmost capacity during the past three seasons, driving two dynamo machines. The trial was made while the engine was performing its ordinary work, and was conducted by Mr. W. E. Rich, and Professor Kennedy, of the London University, two engineers of the highest standing and experience. The results therefore were obtained with the greatest care, and may be relied on as accurate, and are especially interesting to locomotive engineers as showing what a compound locomotive may be expected to do, though the results obtained on a large compound locomotive working at 100 or 180 lbs. boiler pressure should be considerably better than those obtained with a similar but smaller engine working at 107 lbs. pressure.

PARTICULARS OF TRIALS.

Cylinders, high-pressure.....	12½ in. by 14 in.
low-pressure.....	20 in. by 24 in.
Ratio.....	1 to 2.66.
Boiler, steel, locomotive type.....	
Flues, lap welded, number.....	100
Maximum working pressure.....	120 lbs.
Actual average working pressure.....	107 lbs.
Coal consumed per I. H. P. per hour.....	2.529 lbs.
Steam used in cylinders per I. H. P. per hour.....	23.8 lbs.
Water evaporated per lb. of coal.....	9.41 lbs.
Equivalent evaporation from and at 212° F.....	11.3 lbs.
Duration of trial, 5 hours 42 minutes.....	
Average number of revolutions per minute.....	103.9
Average piston speed.....	415.6 ft.
" indicated H. P. per diagrams.....	111
Total work done.....	1,253,000,000 ft. lbs.
" coal consumed.....	1,594 lbs.
" water evaporated.....	14,925 lbs.
Temperature of feed water.....	55° F.
Quality of coal used—Welsh Navigation of good quality.....	

The engine has performed a considerable amount of hard work, and was not in any way put in order for the experiment. The tubes of the boiler, after three years' use, were doubtless more or less covered with scale, which would impair its steaming powers. The engine is constructed to work at a steam pressure of 120 lbs. and economically to give off 90 indicated H. P., whereas during the trial 111 indicated H. P. was given off with a pressure of 107 lbs., under the circumstances a very creditable performance. The engine ran with great steadiness at a mean speed of 103.9 revolutions per minute, and at no time did the speed fall below 103 revolutions. The calculated speed was 104 revolutions per minute.

The Bessbrook & Newry Electrical Tramway.

This line in the north of Ireland permits of the use of vehicles suitable for ordinary roads, and is in many other respects a great advance upon the Port Rush and other electrical lines. The road traffic between Bessbrook and Newry, 3 miles apart, amounted to about 28,000 tons per annum, but as it was difficult to make a junction with the ordinary railroad at Newry, and the freight would in any case have to be carted to the spinning mills at Bessbrook, it was finally decided to supersede road transit, not by an ordinary railroad, but by an electrical tramway on which a modification of the usual road wagon could run. These wagons have 2½ in. tires with no flanges, and can run on any good highway. The front part of a wagon is carried on a bogie, which can either be pinned so as to make a fixed wheel base, or can be allowed freedom of movement as in an ordinary road vehicle. To the fore bogie horse shafts can be attached for use on the roads. The wagons will carry a maximum load of two tons each, which, except upon very steep gradients, an ordinary horse can draw on the country roads. On the outside of the ordinary tramway rails second rails have been laid of a higher section, to which the ordinary rails act as a guard. The flangeless wheels run upon these outside rails, and their motion is restricted by the inside rails. The only motive power employed is electricity, generated entirely by water-power. The maximum load is 58,000 lbs., consisting of a train of six wagons, which carry about two tons each, and the electrical locomotive, weighing 18,000 lbs., which also forms the passenger car, and is capable of accommodating thirty-four passengers. This load can be brought up inclines averaging 62 ft. per mile at a speed of seven miles an hour, and up the steepest incline of 105 ft. per mile at a speed of six miles an hour. The train can be started at any point on the line, even on the steepest incline, with perfect ease. It is claimed that this performance is considerably in excess of that obtained on any other electrical line in regular working.

A 65 horse-power turbine situated midway between the termini operates two Edison-Hopkinson dynamos, each capable of working the full load. The current from the generating dynamos is conveyed to a convenient switch-board, and thence to the conductor, which consists of an inverted steel channel carried on insulators, and fixed midway between the ordinary tramway rail. From the conductor the current is taken to the motors on the car, which are of the same type as the generators, and have been specially designed by Dr. Edward Hopkinson, and are capable of developing 25 indicated horse-power. The car is geared so as to be able to run at a maximum speed of 15 miles per hour, and this speed is easily attained on the level and up the whole line, when the car only is run without the train of freight cars or wagons. The combined motor and passenger cars are 35 ft. long, carried on two trucks, and pass readily over curves of 55 ft. radius. At level crossings, the conductor is supported 15 ft. above the road level. The car passes under the supports of these wires, and an iron bar on the car serves as a collector, and lifts them slightly so as to make a good contact. The current is thus never broken.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual meeting, at the Meionaon in Boston, at 11 a. m. on Dec. 8.
Cincinnati, Hamilton & Dayton, special meeting, at the office in Cincinnati at 10 a. m. on Nov. 30.
Florida Railway & Navigation Co., special meeting, at the office in Fernandina, Fla., at noon on Dec. 3.
Lehigh & Hudson River, annual meeting, at the office in New York, Dec. 6.
New York, Lake Erie & Western, annual meeting, at the office in New York, Nov. 30.
New York, New Haven & Hartford, annual meeting, in New Haven, Conn., Dec. 15.
New York & New England, annual meeting, at the office in Boston, Dec. 14. Transfer books close Nov. 27.

Peoria, Decatur & Evansville, special meeting, in Peoria, Ill., Dec. 20.

Richmond & Danville, annual meeting, at the office in Richmond, Va., Dec. 8, at noon. Transfer books close Nov. 8.

Richmond & West Point Terminal Co., annual meeting, in Richmond, Va., at noon on Dec. 7.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable Dec. 15, to stockholders of record on Nov. 23.

Cincinnati, Indianapolis, St. Louis & Chicago, 1½ per cent., quarterly, payable Dec. 15, to stockholders of record on Dec. 3. This company increases from 1 to 1½ per cent.

Lehigh Coal & Navigation Co., 2 per cent., semi-annual, payable Dec. 11, to stockholders of record on Nov. 30.

Wilmington & Weldon, 4 per cent., semi-annual, payable Jan. 15.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.

The *New England Railroad Club* holds its regular meetings at its rooms in the Boston & Albany passenger station in Boston, on the second Wednesday of each month.

The *Western Railway Club* holds its regular meetings at its rooms in Chicago on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

Railway Passenger & Freight Conductors' Mutual Aid & Benefit Association.

This Association held its twelfth annual convention in Chicago, Nov. 17, with 125 delegates present. The first day's session was taken up by routine work, the appointment of committees and the presentation of reports. Charles Huntington, Secretary and Treasurer, reported as follows: Members in good standing, 1,316; total amount of premium paid for losses since organization, \$354,839; total amount paid for death and disability claims from surplus funds in treasury since 1877, \$50,000; amount paid for expenses from surplus funds in treasury from 1877 to 1886, \$19,241; amount paid from surplus receipts, \$69,241; total amount of receipts for the past year, \$44,069; total expenses and disbursements, \$42,487; balance on hand after deducting last assessment, \$445.

On the second day it was decided to suspend for six months the article of the by-laws which prescribes expulsion for neglect or refusal of a member to pay an assessment within 30 days of demand, this action being taken to permit reinstatement of a number of members. Officers were elected, and the convention adjourned.

ELECTIONS AND APPOINTMENTS.

Atlantic, Greenville & Western.—The following directors were elected at a meeting in Ninety-Six, S. C., Nov. 5: H. P. Hammett, A. E. Smith, W. P. McKelvey, J. W. McCullough, Willie T. Jones, G. T. Jackson, W. S. Allen, W. J. Reidy, G. W. Turner. Mr. J. B. Humbert was elected President and T. R. Denny Vice-President.

Boston, Revere Beach & Lynn.—At the annual meeting in Boston, Nov. 18, the following were unanimously elected directors: Edwin Walden, Edward Tyler, David H. Sweetser, Matthew Bolles, Amos F. Breed, L. S. Judd, Isaac P. T. Edmonds, Joseph W. Smith, Jesse Tirrell.

Bridgton & Saco River.—At the annual meeting in Bridgton, Me., Nov. 17, the following directors were chosen: Wm. F. Perry, W. A. Stevens, A. H. Burnham, John W. Fowler, A. H. Walker, Samuel S. Fuller, Darwin Ingalls, Almon Young, Wm. H. Milliken. The board elected Wm. F. Perry President; J. A. Bennett, Secretary and Superintendent; P. P. Burnham, Treasurer.

Chicago, Kansas City & Omaha.—The directors of this new company are: Joseph Rindols, Samuel W. Allerton, Morris J. W. Vretzinger and William Armstrong, all of Chicago.

Chicago, Rock Island & Pacific.—Mr. W. J. Ryan has been appointed Chief Train Dispatcher of the East Iowa Division, with office in Davenport, Ia., in place of B. Bailey, transferred.

Eastern.—Mr. C. R. Codman has been chosen a Trustee for the bondholders in place of Willard P. Bacon, resigned.

Fitchburg.—Mr. L. W. Bartlett has been appointed Car Agent, with office in Boston. Mr. F. B. Shepley has been appointed Claim Agent, with office in Boston, in place of Mr. J. F. Adams, promoted to Division Superintendent.

Fort Worth Western.—This company has organized with the following officers: President, Gen. Henry Slocum, New York; First Vice-President, W. W. H. Lawrence, Fort Worth; Second Vice-President, Calvin Broadhead, New York; Secretary and Treasurer, George P. Sheldon, New York. The directors are: Henry Slocum, Daniel Butterfield, George P. Sheldon, Calvin Broadhead, New York; E. A. Moss, R. M. Wynne, W. F. Lake, B. B. Paddock, W. W. H. Lawrence, Fort Worth, Texas. Mr. W. W. H. Lawrence is General Agent at Fort Worth.

Merrill & Abbottsford.—The directors of this company are: E. L. Bump, Merrill, Wis.; F. W. Kickbush, Wausau, Wis.; A. A. Krouse, Howard Morris, Frederick Reibrock, Milwaukee, Wisconsin.

Mexican Central.—Mr. Levi C. Wade, President, has issued the following notice: "Mr. Edward W. Jackson, General Manager, will act as Traffic Manager of this company until otherwise ordered, in place of Mr. H. C. Barlow, formerly located at Chicago. Until otherwise notified, please direct all general correspondence heretofore addressed to Mr. Barlow at Chicago to Mr. G. W. Keeler, General Eastern Agent, No. 261 Broadway, New York, or to Mr. Jackson, El Paso, Texas."

Milwaukee & Northern.—Mr. W. B. Sheardown has been appointed General Passenger Agent, with office in Milwaukee, Wis., to date from Nov. 20.

Mississippi River & Northwestern.—The directors of this new company are: J. M. Whitehill, James Murphy, Henry Thane, J. P. Whitehill, Arkansas City, Ark.; H. M. Cross, G. P. Bangs, E. E. Pratt, Boston.

Mobile & Ohio.—The debenture-holders met in New York, Nov. 20, and nominated the old directors for re-election by the trustees, who hold all the stock in trust.

Nashville Marginal.—This company has elected the following directors: J. M. Hamilton, A. E. Baird, M. A. Spurr, A. G. Negley, A. L. Crawford, Wm. Livingston, S. W. Edwards. The officers are: J. M. Hamilton, President; A. E.

Baird, Secretary; M. A. Spurr, Treasurer; A. G. Negley, Chief Engineer.

New Orleans & Fort Scott.—The directors of this Arkansas company are: S. H. Stitt, A. B. Gaines, D. C. Rugg, R. G. Davis, Hot Springs, Ark.; W. D. Leeper, Malvern, Ark.; John H. Rice, Fort Scott, Kan.; E. D. Smith, L. L. Bush, Lancaster, Pa.; John Kelly, Philadelphia.

Old Colony.—At the annual meeting in Boston, Nov. 23, the following directors were chosen: Thomas Dunn, Newport, R. I.; Charles L. Lovering, Taunton, Mass.; W. J. Rotch, New Bedford, Mass.; Thomas J. Borden, John S. Brayton, Fall River, Mass.; Royal W. Turner, Randolph, Mass.; John T. Russell, Plymouth, Mass.; Charles F. Choate, Southboro, Mass.; F. L. Ames, Easton, Mass.; Samuel C. Cobb, Urie Crocker, George P. Gardner, Boston. The board subsequently re-elected Charles F. Choate President; John S. Brayton, Clerk; J. W. Washburn, Treasurer.

Philadelphia & Reading.—The following circulars from Acting General Manager A. A. McLeod are dated Philadelphia, Nov. 18:

"Mr. I. A. Sweigard is hereby appointed General Superintendent of this company, and will assume the duties of the office at once. He shall have charge of the operations of the Transportation Department, and of the distribution of the cars and equipment. He shall also have charge of station agents, and shall perform such other duties as may be assigned to him by the General Manager."

"Mr. M. F. Bonzano is hereby appointed Division Superintendent in charge of Germantown & Norristown Branch and North Penn and Bound Brook Division, vice I. A. Sweigard, promoted."

The office of General Superintendent is a new one on this road. Mr. Bonzano was recently Division Engineer of the branches of which he is now Superintendent.

Mr. George Eitz is appointed Superintendent of the main line and of the Lebanon Valley, East Pennsylvania, Allentown, Schuylkill & Lehigh, Steelton, Colebrookdale, Pickering Valley, Chester Valley, and Philadelphia & Chester branches, which will hereafter form the Main Line Division. The office of Superintendent of Transportation has been abolished. Mr. E. F. Smith is appointed Superintendent and Engineer of Canals, with office at Reading.

Pittsburgh & Lake Erie.—Mr. David Hardy has been appointed Supervisor of Trains. Mr. L. S. Ewart has been appointed Chief Train Dispatcher.

Port Jervis, Monticello & New York.—The officers of this new company (successor to the Port Jervis & Monticello) are: President, Henry R. Low, Middletown, N. Y.; Vice-President, Wade Buckley, Port Jervis, N. Y.; Secretary, Charles Clarke, Middletown, N. Y.; Treasurer, O. P. Howell, Port Jervis, New York.

Prescott & Arizona Central.—The officers of this company are: President, F. A. Trittell; General Manager, Thomas L. Bullock; Secretary and Auditor, L. H. Wilson; Superintendent of Construction, J. G. Crowley.

Railway Passenger & Freight Conductors' Mutual Aid & Benefit Association.—At the annual convention in Chicago last week the following officers were elected: President, J. R. Sandy, Chicago; Vice-Presidents, W. S. Sears, Adrian, Mich.; E. Cowen, Kansas City; Secretary and Treasurer, Charles Huntington, Chicago; Directors: C. A. Loomis, E. A. Ladd, J. C. Curran, W. N. Knight, J. L. Hinman, J. H. Snyder, J. R. Wheeler.

Richmond, Fredericksburg & Potomac.—At the annual meeting in Richmond, Va., Nov. 17, the following were elected: President, J. P. Brinton; directors, B. F. Newcomer, W. T. Walters, Moncure Robinson, Jr., Wm. H. White.

Richmond & West Point Terminal Co.—The following directors have been chosen, the old board having resigned: Alfred Sully, Emanuel Lehman, Isaac L. Rice, Thomas M. Logan, George F. Stone and J. A. Rutherford. The new board organized by electing Alfred Sully President and T. M. Logan Vice-President. Mr. Edward Lauterbach was elected General Counsel to the board, and Col. W. W. Gordon, of Virginia, General Counsel in the Southern States.

St. Louis, Carondelet & Oak Hill.—The officers are: President, George W. Parker; Secretary, M. Russell; Manager, Capt. J. U. Boffinger. Office in St. Louis.

San Antonio & Aransas Pass.—At a meeting of the directors in San Antonio, Tex., Nov. 9, Lott was elected President and General Manager; S. P. Swenson, New York, Vice-President; B. F. Yokum, Secretary, Treasurer, and Traffic Manager.

Sandy River.—At the annual meeting in Phillips, Me., Nov. 17, the following directors were chosen: N. B. Beal, J. H. Bonney, D. M. Bonney, G. D. Willes, Joel Wilbur. The board re-elected N. B. Beal President and Superintendent; D. M. Bonney, Clerk; J. E. Thompson, Treasurer and General Freight and Passenger Agent.

Savannah, Dublin & Western.—At a meeting of the stockholders in Savannah, Ga., November 8, the following directors were elected: A. B. Linderman, D. G. Hughes, D. M. Hughes, T. F. Johnson, J. L. Warren, J. M. Stubbs, Arthur Pou, James H. Campbell, U. B. Harrold, John H. Pate. A. B. Linderman was elected President; T. F. Johnson, Treasurer; D. M. Hughes, Secretary; Arthur Pou, Chief Engineer.

Sea View.—At the annual meeting of this company (formerly the Coney Island Elevated), on Nov. 16, the following directors were chosen: J. M. Bon, Felix Campbell, Joseph Fahys, Morris Hirsch, Jesse Johnson, A. R. Johnson, James Jourdan, E. L. Langford, J. L. Morrow, Wm. Richardson, F. A. Schroeder, Alonzo Slote, D. H. Valentine, all of Brooklyn, N. Y. The board elected F. A. Schroeder President; J. L. Morrow, Secretary and Superintendent; J. M. Bon, Treasurer.

Turtle Creek.—The officers of this new company are: Geo. Westinghouse, Jr., President; Charles A. Faine, Vice-President; John Caldwell, Treasurer. Headquarters in Pittsburgh.

Wilmington & Weldon.—At the annual meeting in Wilmington, N. C., Nov. 20, the following were elected: President, R. R. Bridges; Directors, W. T. Walters, B. F. Newcomer, H. B. Plant, H. Walters, A. J. DeRosset, Donald McRae, E. B. Borden, W. H. Willard, George Howard, J. P. McCoy. The board elected B. F. Newcomer, First Vice-President; H. Walters, Second Vice-President and General Manager; J. W. Thompson, Secretary and Treasurer; J. F. Divine, Superintendent; J. R. Kenly, Superintendent of Transportation; W. A. Riach, General Auditor.

PERSONAL.

—It is reported that Mr. James B. Pace, of Richmond, Va., has been offered an important position in the new management of the Richmond & Danville Railroad.

—Major T. T. Green has resigned his position as General Agent of the Cincinnati, New Orleans & Texas Pacific Co. at

Louisville, to accept a position on the Richmond & Danville road.

—Mr. Louis Parisoe, recently Master Mechanic of the Nevada Central, has accepted the position of Superintendent of Machinery of the Guatemala Central road, with headquarters at the city of Guatemala, Central America.

—Mr. W. H. Shuey, for several years past General Superintendent of the Worcester Excursion Car Co., has resigned that position, and will, on Dec. 1, become Secretary and Treasurer of the Railway Age Publishing Co., of Chicago.

—Mr. Lewis C. Smith died at his residence in Hagerstown, Md., Nov. 20, aged 43 years. He was a prominent lawyer of western Maryland, and served several terms in the Legislature. He was president of the Chesapeake & Ohio Canal Co. in 1882 and 1883.

—Mr. Thomas P. Harrison died in Baltimore, Nov. 13, aged 25 years. He was a son of Mr. Wm. H. Harrison, Superintendent of Motive Power of the Baltimore & Ohio road, and though a young man had for some time held a responsible position on that company's Trans-Ohio Division.

—Mr. C. S. Sawyer, for nine years past Manager of the Continental Line, died of consumption at Richmond, Va., Nov. 15. Mr. Sawyer has been in poor health for several months, and left his home in Cincinnati three months ago for Richmond, in the hope that a change of climate might benefit him.

—Hon. Hiram Cable died at his residence in Davenport, Ia., Nov. 20, aged 70 years. He was born in Athens County, O., and was a man of considerable note when he removed to Davenport in 1857. He was one of the projectors and for several years a director of the old Indiana Central Railroad Co. He was father of Mr. R. B. Cable, President of the Chicago, Rock Island & Pacific Company.

—Mr. G. M. Beach, General Manager of the Cleveland, Columbus, Cincinnati & Indianapolis road, last week celebrated the 25th anniversary of his wedding. The officers of the company called on Mr. and Mrs. Beach, giving them a cleverly and completely arranged surprise, with music and refreshments. Mr. and Mrs. Beach were the recipients of many elegant presents. Noticeable among them was a costly case of solid silver, presented by the officers of the company.

—Mr. Allen Young Stokes died in Richmond, Va., Nov. 19, aged 67 years. He was born in North Carolina, but moved to Richmond 45 years ago and entered into business there. He was very successful, and soon built up a prosperous business. Mr. Stokes was connected with the Richmond & Danville Railroad almost from its first beginning, and was for many years a director and Vice-President of the company. He retired a few years ago. At the time of his death he was a director of the Richmond & Allegheny Co., and was also a director of the Cape Fear & Yadkin Valley Co., in which he was largely interested.

—Mr. John Dougherty, of Mount Union, Pa., who invented the portable iron section boats and devised the inclined planes over the Allegheny Mountains in the days of the old Portage Railroad, died in Pittsburgh Nov. 12, at the age of 83 years. Mr. Dougherty is credited with suggesting the route of the Pennsylvania Railroad, and in 1857 obtained a charter for the Sherman Valley & Broad Top Railroad, which, by acts of Assembly, was finally merged into the South Pennsylvania Railroad. His latest railroad scheme was a proposed route from Canada via Buffalo to Washington. Mr. Dougherty was one of the most active and influential business men in Central Pennsylvania.

—Mr. Herbert Mallory Hoxie, of St. Louis, First Vice-President and General Manager of the Missouri Pacific system of railroads, died in New York, Nov. 23. In railroad circles everywhere he was considered a man of unusual ability in his profession, and it is conceded that to his management was due the victory won by his company last spring in the strike that existed over 5,000 miles of road.

Mr. Hoxie was a native of New York, having been born at Palmyra, Wayne County, on Dec. 13, 1830. When he was only 5 years old his parents moved to Buffalo, but remained there only two years, settling at Des Moines, Ia., when on the site of the present city there stood a fort and a trading post. There he assisted his father in farming and in trading with the Indians. He was smitten with the gold fever in 1850, and traveled overland to California, where, however, he failed to make a fortune. Returning to Iowa, he became interested in farming once more, this time with the Hon. Thos. Mitchell, whose niece he afterward married. He became actively engaged in politics, and just before the breaking out of the war was made Chairman of the Republican State Committee. At the beginning of the war he was appointed United States Marshal of Iowa.

He was General Superintendent of the Union Pacific Railroad while it was under construction. The vast supplies needed in the construction of the road were collected and forwarded under his personal supervision. He was always at the front, invariably accompanied by his wife. Upon the completion of the road Mr. Hoxie resigned his position and rested for a year. In the latter part of 1870 he was appointed General Superintendent of the International Railroad, Texas, of which John S. Barnes was President. He became General Manager of the International & Great Northern Railroad, after the two roads had been consolidated in 1872. In 1880 Colonel Thomas A. Scott selected him as General Manager of the Texas & Pacific Railroad, and a year later he was given the same position over the St. Louis, Iron Mountain & Southern and all the roads in Texas controlled by Mr. Gould. In 1883, when the Wabash road was annexed to the system, Mr. Hoxie was elected First Vice-President of that corporation, as well as of the Gould Southwestern system, and in 1885, upon the resignation of Capt. R. S. Hayes, he was made General Manager of the system. Soon after the conclusion of the strike on the system he was compelled to relinquish his work and come East to secure health and rest. He was accompanied by Mrs. Hoxie. He spent the greater part of the summer at Saratoga, and after a trip through portions of Ontario and Quebec and a visit to the White Mountains returned on Sept. 10. His physical condition had not improved, and nine weeks ago yesterday he submitted to a surgical operation by which several calculi were removed from the bladder. A second operation was performed four weeks ago, but was of no avail. He was unable to assimilate the little food he swallowed, and simply wasted away. He suffered a great deal of pain, but bore it without a murmur. His wife and nurse were with him when he died. His body will be taken to Des Moines.

TRAFFIC AND EARNINGS.

Coal.

Coal tonnages for the week ending Nov. 13 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite.....	778,573	830,073	D. 51,500	6.2
Eastern bituminous.	280,247	275,554	I. 4,693	1.7
Coke.....	82,991	83,025	I. 34	0.04

The anthracite market is not very active, continued mild

weather having a somewhat depressing effect. The companies have decided to make no advance in prices at present. Cumberland coal shipments for the week ending Nov. 13 were 61,788 tons. Total to Nov. 20 this year, 2,328,141; last year 2,487,581; decrease 259,440 tons, or 10.4 per cent.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Ten months to Oct. 31:	1886.	1885.	Inc. or Dec.	P. c.
Ala. Gt. South....	\$953,794	\$861,850	I. \$91,944	10.6
Balt. & Potomac....	1,108,842	1,069,415	I. 39,427	3.7
Net earnings....	458,729	445,032	I. 13,697	3.1
Mich. & Ohio....	182,791	151,166	I. 31,625	20.9
N. Ori. & N. E....	496,607	539,403	D. 42,796	7.9
Northern Central....	4,523,658	4,499,639	I. 24,019	0.5
Net earnings....	1,570,519	1,806,126	D. 235,607	13.1
South Carolina....	969,232	916,212	D. 53,020	5.8
State Island....	704,389	583,249	I. 121,140	20.8
Vicks. & Mer....	397,504	347,287	I. 50,217	14.5
Vick., Shre. & P....	380,163	317,596	I. 62,567	19.7
Nine months to Sept. 30:				
C. I., St. L. & C....	\$1,898,204	\$1,752,817	I. \$145,387	8.3
Net earnings....	740,439	625,653	I. 114,786	18.2
E. Ten. Va. & G....	3,420,554	3,311,102	I. 109,452	3.3
Oreg. Short Line....	1,456,110	1,323,092	I. 133,018	10.1
Net earnings....	394,331	419,578	D. 25,247	6.0
So. Pacific Co....	6,114,429	6,292,090	D. 177,661	2.9
Atlantic System....	1,401,057	2,435,104	D. 1,034,047	47.5
Pacific System....	17,128,325	15,802,391	I. 1,325,934	8.4
Net earnings....	8,567,145	8,427,217	I. 139,928	1.7
Month of September:				
C. I., St. L. & C....	\$285,523	\$219,256	I. \$66,267	30.7
Net earnings....	99,822	88,485	I. 11,337	12.7
Den. & R. G. W....	90,556	104,953	D. 14,397	15.9
Net earnings....	31,117	46,570	D. 15,453	49.0
E. Ten. Va. & G....	384,380	379,424	I. 4,956	1.3
Net earnings....	167,207	162,534	I. 4,673	2.9
Oreg. Short Line....	162,830	184,174	D. 21,344	11.6
Net earnings....	27,065	66,223	D. 39,158	50.3
So. Pacific Co....	723,771	850,191	D. 126,420	14.0
Atlantic System....	166,585	356,435	D. 189,850	75.0
Pacific System....	2,233,809	2,013,614	I. 220,195	11.0
Net earnings....	1,153,788	1,190,072	D. 36,284	3.0
Month of October:				
Ala. Gt. South....	\$124,072	\$104,273	I. \$19,799	19.0
Balt. & Potomac....	120,640	127,145	D. 6,505	5.1
Net earnings....	66,232	60,377	I. 5,855	9.7
Mar. & N. Ga....	13,900	.....	.....	.....
Mich. & Ohio....	22,698	20,297	I. 2,401	11.8
N. Ori. & N. E....	74,462	77,897	D. 3,435	4.3
Northern Cen....	516,825	534,011	D. 17,186	3.2
Net earnings....	190,864	244,126	D. 53,262	27.9
South Carolina....	134,807	134,960	D. 153	0.1
State Island....	56,712	54,882	I. 1,830	3.3
Vicks. & Mer....	54,047	48,061	I. 5,986	12.3
Vick., S. & P....	68,193	58,499	I. 9,694	16.6
Second week in November:				
Balt. & Potomac....	\$28,971	\$27,551	I. \$1,420	5.1
Cairo, V. & C....	14,621	10,116	I. 4,505	44.9
Canadian Pacific....	269,000	205,000	I. 64,000	31.2
Chic. & Atlantic....	34,331	26,969	I. 7,362	27.3
Chi. & East. Ill....	40,984	49,218	D. 8,234	20.1
Chic. & N. W....	575,800	535,800	I. 40,000	7.4
Chic., St. P., M. & O....	182,560	145,300	I. 37,260	25.6
C. I., St. L. & C....	47,489	44,000	I. 3,489	7.9
Cin. H. & Day....	59,545	56,999	I. 2,546	4.5
Illinois Central....	275,800	268,291	I. 7,509	2.8
Iowa lines....	44,400	37,995	I. 6,405	16.9
Louisv. & Nash....	306,150	270,310	I. 35,840	13.3
Mil. & Northern....	14,876	11,815	I. 3,061	25.9
Norfolk & West....	75,758	61,806	I. 13,952	22.6
Norfolk Pacific....	323,400	301,459	I. 21,941	7.3
St. P. & Duluth....	33,464	38,540	D. 5,076	13.1
Wab., St. L. & P....	255,000	250,000	I. 5,000	2.0
Third week in November:				
Denver & R. G....	\$156,020	\$133,696	I. \$22,324	16.7

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Cotton.

Cotton movement for the week ending Nov. 19 is reported as follows, in bales:

Interior markets:	1886.	1885.	Inc. or Dec.	P. c.
Receipts.....	177,394	188,044	D. 10,650	5.7
Shipments.....	157,911	158,714	D. 803	0.5
Stock, Nov. 19.....	337,180	309,281	I. 27,899	9.0
Seaports:				
Receipts.....	268,596	270,421	D. 1,825	0.7
Exports.....	113,675	216,230	D. 102,554	47.5
Stock, Nov. 19.....	864,325	778,082	I. 86,243	11.1

The total shipment from plantations for the crop year to Nov. 19 are estimated at 2,634,818 bales, against 2,671,924 last year, 2,581,357 in 1884 and 2,694,550 in 1883.

Southern Kansas Pool.

At a meeting held in Chicago last week the agreement heretofore proposed was adopted finally. The Arbitrators chosen held a meeting at which the parties in interest submitted their arguments on the question of basing rates from St. Louis.

Anthracite Coal Tonnage.

Anthracite coal tonnage for October and the ten months to Oct. 31, as reported by Mr. John H. Jones, the Official Accountant, was as follows, the statement including the entire production of anthracite coal, excepting that consumed by employees and for steam and heating purposes about the mines:

	October.		Ten months.		
	1886.	1885.	1886.	1885.	1884.
Phila. & Reading.....	1,329,678	1,237,321	9,440,578	9,370,612	9,370,612
Lehigh Valley.....	698,244	700,733	4,960,204	4,817,743	4,817,743
Del., Lack. & West.....	550,020	642,161	4,165,280	4,070,653	4,070,653
Del. & Hud. Canal Co.....	372,765	387,376	2,867,001	2,598,723	2,598,723
Pennsylvania Railroad.....	356,237	341,195	2,678,121	2,723,737	2,723,737
Pennsylvania Coal Co.....	166,110	183,810	1,140,676	1,195,958	1,195,958
N. Y., L. E. & W.....	71,124	69,570	565,507	510,358	510,358
Total.....	3,512,178	3,562,166	26,047,376	25,347,569	25,347,569
Decrease for the month, 49,988 tons, or 1.4 per cent. of the Reading and the Pennsylvania Railroad alone show increases. Increase for the year, 699,787 tons, or 2.8 per cent. of all the companies except the Pennsylvania Coal Co. show gains.					
The actual division of tonnage for the ten months has been as follows, for four years:					
	1886.	1885.	1884.	1883.	1882.
Philadelphia & Reading.....	36.2	37.0	36.4	37.7	37.7
Lehigh Valley.....	19.0	19.0	19.3	19.7	19.7
Del., Lack. & Western.....	16.0	18.1	16.8	16.0	16.0
Del. & Hudson Canal Co.....	11.0	10.2	11.0	11.0	11.0
Pennsylvania Railroad.....	11.1	11.0	10.6	8.7	8.7
Pennsylvania Coal Co.....	4.4	4.7	4.6	4.8	4.8
N. Y., Lake Erie & Western.....	2.3	2.0	1.3	1.2	1.2
Total.....	100.0	100.0	100.0	100.0	100.0

The stock of coal on hand at tidewater shipping points, Oct. 31, 1886, was 440,962 tons; on Sept. 30, 1886, 518,306 tons; decrease, 77,344 tons, or 14.9 per cent., during the month. The stock on hand Oct. 31, 1885, was 661,616 tons.

Central Traffic Association.

The following circular to connecting lines is issued by Assistant Commissioner Daniels, on behalf of the Association:

Passenger Department of this Association; it is dated Nov. 17:

"The lines forming this Association have agreed to divide their earnings from competitive east-bound passenger traffic, and having restored all east-bound rates to full tariff as shown in the rate sheets published by authority of the various railroad companies and associations, we are obliged to require that commencing Dec. 1, 1886, in ticketing passenger business over these lines from Chicago, Peoria, Bloomington, St. Louis, Louisville, Indianapolis, Cincinnati, or other gateways of this Association, to the western termini of the trunk lines or points east thereof, you will observe the following rules:

"1. That you report to these lines their full proportions of regular through rates via the route of the ticket.
"2. That you report to these lines full unlimited local rates on all unlimited tickets.
"3. That you limit to continuous passage all tickets sold at less than unlimited local rates."

Traffic Notes.

During the month of October the total earnings of the Central Iowa Traffic Association amounted to \$46,011 on west-bound business, and \$3,505 on east-bound business. In October, 1885, the figures were: West-bound, \$52,044; east-bound, \$3,373.

An attempt was made to bring about a meeting of the representatives of the various lines interested in the trans-Atlantic business in Chicago this week. The attempt, however, failed, several of the companies having declined to join in the meeting.

A meeting of the New Mexico & Arizona Pool was held in Chicago last week, at which it was decided to reduce rates on freight to El Paso for points in Mexico.

The express war which has been going on for some time past has been ended by an agreement made by all the companies to restore the rates in force on May 1 last.

The Iowa, Minnesota & Dakota Traffic Association was organized at a meeting held in Chicago last week, with Mr. George L. Carman as Commissioner, to cover business between Chicago and local points in the states named. The plan provides for no pool or sub-pools, but merely for a traffic agreement in the interests of a steady maintenance of rates. The association is to remain intact from Dec. 1, 1886, until Jan. 1, 1888. No line can give notice of withdrawal before that time.

New divisions in the Peoria Pool were arranged by the Arbitrators last week, and have been submitted to the Commissioner of the Central Traffic Association.

Chicago Shipments Eastward.

The Board of Trade reports east-bound shipments from Chicago for the week ending Nov. 20 as follows, in tons:

	Tons.	F. c.		Tons.	P. c.
Chi. & Gd. Trunk..	2,791	7.3	Pitts., Ft. W. & C.....	6,406	16.7
Mich. Central.....	4,656	12.1	Chi., St. L. & Pitts.....	6,597	17.1
Lake Shore ...	6,491	16.9	Balt. & Ohio.....	3,210	8.4
N. Y., Chi. & St. L.....	4,453	11.6	C. Ind, St. L. & C.....	4,453	11.6

The statement includes local as well as through shipments. The total for the week was 38,409 tons, being an increase of 1,358 tons, or 3.7 per cent., over the previous week. The shipments, although thus exceeding those of the previous week, were smaller than any others reported since Oct. 7.

Shipments for eight weeks past by these reports have been, in tons:

Oct. 2.	Oct. 9.	Oct. 16.	Oct. 23.	Oct. 30.	Nov. 6.	Nov. 13.	Nov. 20.
36,122	43,556	41,347	45,820	46,688	41,883	37,051	38,409

Shipments by the Chicago & Atlantic road are not included above; the through tonnage by that line for the week ending Nov. 20 is given at 4,102 tons. These shipments include dead freight only.

East-bound Freight Rates.

The recommendation of the Central Traffic Association that freight rates be advanced to the basis of 30 cents per 100 lbs. on grain from Chicago to New York, was submitted to the vote of the trunk lines by Commissioner Fink, Nov. 22. Mr. Fink sent the following dispatch to Commissioner Blanchard announcing the result of that vote: "The vote of the trunk lines on the proposed advance of east-bound tariff is not unanimous, some of the trunk lines desiring further time for consideration of the matter. The proposed advance will, therefore, not take effect Dec. 1."

Western Railway Weighing Association.

The sixth annual meeting of this Association was held in Chicago, Nov. 18. This Association has for its purpose the weighing of all freight, so that no shipper may take advantage of a railroad by paying for less than the proper weight. Commissioner J. R. Wheeler reported that during the fiscal year ending Aug. 31, 721,188 cars of freight had been weighed, against 684,222 cars during the preceding year. From Sept. 1, 1880, when the organization was effected, until Aug. 31, 1886, the Association weighed 3,513,748 cars of freight. There was a discussion as to the amount of money saved to the railroads by weighing this freight. Commissioner Wheeler estimated the gain at an average of \$5 per car. The members of the Association considered this a very low estimate. Nevertheless, at \$5 per car the railroads were saved \$3,605,940 during the year ending Aug. 31, 1886, and \$17,568,740 during the six years that the Association has been in effect. The following gentlemen were elected to the new Executive Committee: George H. Ross, of the Burlington; P. G. Murray, Missouri Pacific; J. M. Johnson, Rock Island; D. W. Keyes, St. Paul; J. T. Clark, Omaha; T. H. Malone, Wisconsin Central, and C. L. Wellington. The officers will be elected at a later meeting of the Executive Committee.

Commissions on Tickets.

Assistant Commissioner Daniels, of the Central Traffic Association, Passenger Department, has issued a circular containing the following notice:

"An agreement having been entered into for the maintenance of full tariff fares, and for the better protection of the interests of the lines in this Association, it has been decided that no commission or compensation of any kind or character will be paid upon any ticket which may be found in the hands of a broker, or which has been used for the purpose of reducing tariff rates."

Interior Passenger Association.

At the meeting of general passenger agents called by Assistant Commissioner Daniels last week, there was a large attendance, and it was decided to form the Interior Passenger Association. An agreement was adopted, which does not differ in its essential features from that governing the Passenger Department of the Central Traffic Association, special and theatrical rates being based on the same ratio and governed by similar rules. Penalties for cutting rates are provided—\$25 for each violation, \$20 of which goes to the informer. Appeals may be taken from the decision of the Chairman, each party choosing an arbitrator, and the two a third, if necessary. The Association, which is not a pool, but merely an agreement to maintain standard rates, will go into effect December 1, with George H. Daniels as Chairman. Any member may withdraw by giving due notice, which shall take effect 30 days after being filed. The new

organization is successor to the old Central Passenger Committee, and is auxiliary to the Central Traffic Association. Its territory is the same as that covered by that Association, but the rates subject to the provisions of the articles of agreement are those in force up to the western termini of the eastern trunk lines, or interior, in contradistinction to through rates.

Southwestern Railway Association.

Commissioner J. W. Midgley has prepared a statement showing the business done by the lines in the Southwestern Railway Association from Jan. 1 to Sept. 30, 1886. The tonnage was as follows: West-bound, 635,963; east-bound, 687,259; total, 1,313,221. The revenue was as follows: West-bound, \$3,534,371; east-bound, \$2,803,447; total, \$6,337,818.

Large Wool Shipment from a Little Station.

Early in November there was standing at Amargo, New Mexico, a station with a population of about 25 persons, on the San Juan Division of the Denver & Rio Grande Railway, a train of 25 cars, which had been loaded there with wool, all the property of one man. At a station further west 8 more cars were loaded, and the 33 cars made a train of two sections over the heavy grades, consigned via Denver and the Union Pacific to Chicago.

Rules and Regulations for Conduct of the Joint Committee of the Eastern Trunk Lines and the Central Traffic Association.

The following was issued by Commissioner Blanchard, of the Central Traffic Association, Nov. 16:

"The following rules and regulations for the conduct of the Joint Committee were adopted by the Central Traffic Association, Oct. 20, 1886, and by the Trunk Line Executive Committee, Nov. 11, 1886, and will take effect immediately.

"The committees therein named, and members of the Association, are respectfully requested to conform to the usage prescribed:

"Sections 30 to 36 of the Trunk Line Organization and Rules provide for the establishment of a Joint Committee, for the purpose of establishing joint tariffs with all the roads with which the Trunk Lines have traffic arrangements, and Section 30 provides that said Committee may make such additional organization as may be deemed desirable to carry out the object for which it is established.

"Article 6 of the Organization of the Central Traffic Association provides that 'through joint rates and fares between points in its territory and points in the territory of other similar organizations shall be made by co-operation and issued or authorized by this Association in its territory.'

"In order to carry out these provisions in the organization of both associations, the members of the Trunk Line Executive Committee and of the Central Traffic Association, and all companies having traffic arrangements with both organizations under their several contracts, who are not members of these organizations, shall constitute a committee to be called the Joint Committee.

"It shall be the duty of the Joint Committee to establish all joint tariffs, both freight and passenger, on traffic passing through the western termini of the trunk lines; also to agree upon the classification and other conditions governing said tariffs. Further to agree upon the division of through rates and through fares, where such divisions affect the maintenance of uniform tariffs between competing lines, and to make such other rules and regulations as are necessary to secure uniformity and stability in the joint tariffs.

"The Commissioner of the Trunk Line Executive Committee shall act as Chairman of the Joint Committee.

"The Commissioner of the Central Traffic Association shall act as the Western, and the Commissioner of the Freight or Passenger Department of the Trunk Line Executive Committee shall act as the Eastern, Vice-Chairmen of the Joint Committee.

"There shall be appointed by the Western Vice-Chairman, with the concurrence of the Chairman, the following sub-committees: East-bound Classification Committee, Cotton Rate Committee, Tobacco Rate Committee; and any other committees that may be necessary to facilitate the transaction of business shall be appointed and confirmed in the same way. Said committees shall be appointed from representatives of the roads west of the western termini of the trunk lines. To these committees shall be referred all questions which may require their consideration.

"Said committees shall submit their reports to the Chairman and Western Vice-Chairman of the Joint Committee, and the same shall be submitted for the vote of all the members of the Joint Committee—the vote of the members of the Central Traffic Association to be taken by its Commissioner and reported to the Chairman of the Joint Committee, in detail.

"In like manner the vote of the Joint Committee shall be taken upon any question presented to it by the Trunk Line Executive Committee or by the Central Traffic Association.

"If the vote upon any question is not unanimous, the Trunk Line Executive Committee, under the rules, shall decide the question at issue, after duly considering the vote of each member of the Joint Committee."

Who Gains by Cut Rates?

The *Northwestern Lumberman* of Nov. 13 says: "Numerous dealers hold to the opinion that it would be best for the trade if freight rates, no matter whether high or low, were steadily held. Fluctuations serve to destroy the possibility of making any definite calculations, they say, and steady rates would lead every dealer to know exactly how to plan his business. Nevertheless there are many lumbermen in Chicago, and elsewhere as well, who are pleased when rates go to smash. The possibility of a war between the roads running west from this city, that has been apparent for some time, has caused more than one dealer who has a string of yards to rejoice. These yards must be kept stocked, and if lumber can be laid down in them at a low rate of freight, so much the better. There are also many retail dealers who take advantage of any decline in rates. Men who feel sure that there will be no drop in the price of lumber, and who have money with which to buy at any time and in any quantity desired, avail themselves of every opportunity to lessen the cost of their stock, which is materially done if they pay a ten cent rate instead of nearly double that amount. The ups and downs of rates no doubt work to the disadvantage of some, but there are many shrewd dealers who profit by them."

It is only the dealer with a great trade and a large capital, like the great Chicago firms that have "a string of yards" in Kansas, Nebraska, etc., that can take advantage of a railroad war to lay in stocks for a long period, and this only helps them to crush out the small dealers.

The Chicago Lumber Trade.

The withdrawal of the manufacturers from the yard business here is one of the notable signs of the times. It means that Chicago is becoming an expensive place in which to carry on a wholesale yard, and it also indicates a conviction on the part of the manufacturers that this city has, in a measure, lost its advantage as a point from whence to distribute lumber. The last-named conclusion has been forced by the building of numerous competing railway lines from the pine regions to a connection with all the leading systems

in the West, by which lumber can be forwarded directly from any mill point to interior yards. Competition in distribution has impaired the supremacy that Chicago once enjoyed. But the jobber is still here, and he sees better times ahead by reason of the abandonment of this locality by the manufacturers. He says, "Now the interests of the trade will be more in unison. The manufacturers will no longer demoralize the market by at times slaughtering prices, giving advantages in grades and going easy on terms of payment."

But this prospect has a cloud on it. The manufacturers have retired to the mills, not wholly for the sake of abandoning distribution among retail yards, but to acquire a better basis for direct shipment. They have gone to the mills for the sake of cheaper labor and ample piling ground. They have procured such low rail rates as enable them to send lumber from Menominee to western points, or from Muskegon, cheaper than it can be done through this city by the combined water and rail route. Their piling ground and dockage costs them next to nothing, while the like facilities in this city are so costly that they form a chief item of expense in doing business here. The manufacturers at Menominee who have withdrawn from the trade in this city are shipping their over-grade lumber down into this state and westward as much as they did before, we had about said; but that would be putting it too strongly, for it is a fact that yards here that are in the same kind of trade have made a considerable gain in sales as a result of the absence of their whilom competitors.—*Northern Lumberman*.

Low Suburban Fares from New York.

The Pennsylvania, the New Jersey Central and the Erie companies have, in response to a request from the Board of Trade of Newark, N. J., adopted a system of low-rate workingmen's tickets between that city and New York. The rate fixed on is 10 cents, the special tickets being sold in packages of 10 and made good on any train leaving Newark up to 7 a. m., and New York between 5:30 and 7:30 p. m., or 4:30 and 7:30 on Saturdays. The regular fare between Newark and New York is 20 cents single or 30 cents for round-trip tickets. The special rates adopted are about 1½ cents per mile, and are a little higher than the rate charged for monthly tickets, the only advantage gained being that the purchaser is not required to pay out more than \$1 at a time.

The Pennsylvania Railroad Co. has extended the special rate system to Elizabeth, 5 miles beyond Newark. The rate to that place is a little over 14 cents, seven of the special tickets being sold for \$1.

RAILROAD LAW.

Reasonable Rates—Powers of State Commissions.

The United States Circuit Court has given its decision in the matter of the application of Frank S. Bond, Receiver of the Vicksburg & Meridian Railroad, for instructions as to his compliance with the order of the Mississippi Railroad Commission fixing passenger and freight rates on that road. The Court has made the following order:

"It appearing to the Court from the report of F. S. Bond, the Receiver, and the statements made of the earnings and expenses of the operation and maintenance of said road, appurtenances, etc., that said railroad was operated during the past six months at a loss of nearly \$40,000, and that under the tariff of charges fixed by the Railroad Commission this loss cannot be made up from the earnings of the road for the next six months, after paying all necessary expenses and charges, including taxes, it is therefore ordered that said F. S. Bond make out a schedule of rates for transportation of freight over said road, to be shipped from points within the state to other points with in the state, and that in doing so no unjust discrimination shall be made in favor of or against any individual or place, and that such rates shall be made, judging from the past and reasonable prospective business of the road, including all its income from interstate transportation, the carrying of the United States mail, express transportation, and otherwise, as will be sufficient to pay all the expenses of operating the road, keeping in repair the roadbed, track, bridges, rolling stock, etc., together with all taxes, damages for injuries to persons and stock, and other costs and expenses incident to operating the road, and pay an income to be applied for payments for the purchase of rolling stock and other betterments, and to the indebtedness of said railroad company, not to exceed 6 per cent. on the estimated cash value of said railroad, with its rolling stock and the other property used in operating said railroad. It is further ordered that the Receiver submit the schedule of rates to the Railroad Commission of the state for revision. It is further ordered that the rate of travel on said railroad be continued at 3 cents a mile, as heretofore fixed by order of the commission."

OLD AND NEW ROADS.

Americus, Preston & Lumpkin.—Track on this road is now laid to Antioch, Ga., 10 miles southwest from the late terminus at Lumpkin and 48 miles from the eastern terminus at Americus. Grading is nearly completed from Antioch to Georgetown, on the Chattahoochee River, opposite Eufaula.

Augusta, Gibson & Sandersville.—The directors of this company have decided to build an extension of the road from Sandersville, Ga., which was to be the terminus, south by east to Cochran, on the Brunswick Division of the East Tennessee, Virginia & Georgia road. The distance from Sandersville to Cochran is about 55 miles. The road is now in operation from Augusta, Ga., to Ogechee, 61 miles, and is nearly completed to Sandersville, 15 miles further.

Baltimore & Ohio.—Several meetings are said to have taken place between President Garrett and President Roberts of the Pennsylvania Railroad Co. with a view to an amicable settlement of the differences between the two companies. All sorts of reports are current as to the settlement proposed, one being to the effect that this company's Philadelphia line is to enter Baltimore over the Northern Central tracks, and that it is to have the use of the Pennsylvania tracks between Philadelphia and New York. Nothing really definite has been made public, however, but there seems to be no doubt that negotiations are in progress and that there is a fair prospect of an amicable settlement being reached which will give this company a New York connection without the building of any new road.

Boston, Hoosac Tunnel & Western.—The statement to the New York Commission for the quarter ending Sept. 30 is as follows:

	1886	1885	Inc. or Dec.	P. C.
Earnings.....	\$197,479	\$146,187	I.	\$51,292 35.5
Expenses.....	110,909	116,144	D.	5,175 4.5
Net earnings.....	\$86,510	\$30,043	I.	\$56,467 188.0
Charges.....	36,217	31,160	I.	5,057 16.3
Surplus.....	\$50,293	\$1,117	I.	\$51,410 ...

* Deficit

The improvement this year is largely due to the better rates prevailing on the through traffic which forms so large a part of this company's business.

Buffalo, New York & Philadelphia.—The suit to foreclose the mortgages is now being heard in the United States Supreme Court in Buffalo. The suit is opposed by certain of the holders of the first and second mortgage bonds on the original Buffalo, New York & Philadelphia road. These mortgages cover the 120 miles from Buffalo to Emporium, and the opposing bondholders claim that that division has always earned its interest and that default on those bonds was not justifiable. They charge that the earnings of this division, instead of being used to pay the interest, were taken to support unprofitable sections of the line, and asked for an investigation and accounting. They claim that they are not called upon to surrender their contract to receive 6 per cent. interest for a number of years to come, and are not willing to take the 5 per cent. bonds offered in exchange.

Burlington, Cedar Rapids & Northern.—The total mileage of this company's Waverly Short Line (built early in the year) is 5.7 miles, from Waverly Junction, Ia., on the main line, to Waverly.

The stations on the new Sioux Falls Extension are: Rock Rapids, Lester, Larchwood, Lee Valley, Ia., Springdale and Sioux Falls, Dakota.

California Southern.—The Los Angeles (Cal.) *Herald* of recent date says: "News comes that the work on the Arlington & Los Angeles Railroad via the Santa Ana Valley and Anaheim has been resumed. A large force of men is at the front and pushing things. This will connect with the Los Angeles & La Balleona Road, for which a franchise has been secured. The slough has been scooped out to make a harbor for ships, and in the spring the road is certain to begin. Then there is a new line being located from San Bernardino to this city via Ontario, Cucamonga, Mud Springs and the San Gabriel Valley. News of the inception of this work came to us from San Bernardino a few days ago. Yesterday tents, equipment and men went to the front in the centre of San Gabriel Valley to work the other way. Crank's road is laid out to hug the foothills, and this new project, which is to be the direct trunk of the California Southern from San Bernardino to Los Angeles, will run about midway between the Crank road and the Southern Pacific track. This will bring the line so as to run near the old San Bernardino stage road through the Upper San Gabriel Valley. It will pass not far from Covina. The lines are now being located and it is reported that work will begin at once."

Central, of Georgia.—Surveys have been begun for an extension of the Blakely Branch of this company's Southwestern Division, from Blakely, Ga., to Pollard, Ala., where it will connect with the Mobile & Montgomery road. It is also reported that the Central people will extend their Mobile & Girard line from Troy, Ala., southward to connect with this extension.

In explanation of the Savannah dispatch copied last week it is stated that the Alexander party has not bought Mrs. Green's block of stock outright, but has merely secured her proxies. It is not by any means certain that this will give them a majority of the stock, and the result of the election probably depends upon small local stockholders, who have heretofore adhered closely to Mr. Raoul, as the successor of the late President Wadley and the representative of his policy. Both parties had issued circular letters to this class of stockholders, calling on them to be present at the meeting and to vote. There is considerable excitement locally over the result, and it is probable that a very large vote will be called out.

Chesapeake & Nashville.—Track on this road is now reported laid from Gallatin, Tenn., northward 20 miles, and the company promises to have trains running to Scottsville, Ky., by the close of the year. Grading has been begun on a branch 10 miles in length, which is to run from the main line near Gallatin to Hartsville.

Chicago & Indiana Coal.—Grading has been nearly completed on the extension of this road from Fair Oaks, Ind., to La Crosse, and tracklaying has been begun. This extension will be about 40 miles long, and will connect at La Crosse with the Chicago & West Michigan road.

Chicago, Kansas City & Omaha.—This company has filed articles of incorporation in Illinois to build a railroad from Chicago to a point on the Mississippi opposite Keokuk, Ia. The capital stock of the company is fixed at \$5,000,000.

Chicago, Kansas & Western.—This company, which has already filed articles of incorporation in Illinois, and which will constitute the Atchison, Topeka & Santa Fe's extension to Chicago, has filed articles of incorporation in Missouri under the same name. The line indicated is from Kansas City to Keokuk, and the incorporators are all connected with the Atchison, Topeka & Santa Fe.

Chicago, Rock Island & Pacific.—Track on this company's Chicago, Kansas & Nebraska extension is now reported laid from St. Joseph, Mo., to Denton, Kan., a distance of 36 miles. Tracklaying is also in progress from Fairbury, Neb., in both directions, and at latest accounts the rails were down for 30 miles.

Cincinnati, Hamilton & Dayton.—This company has taken possession of the Dayton & Ironton road, in which it now owns a controlling interest. Work is to be begun at once on the reconstruction of the line and its change to standard gauge. Large contracts for ties and timber have already been let.

Cincinnati, Indianapolis, St. Louis & Chicago.—The statement for September is as follows:

	1886.	1885.	Increase.	P. c.
Earnings.....	\$245,523	\$219,256	\$26,267	11.9
Expenses.....	145,701	130,771	14,930	11.5
Net earnings.....	\$99,822	\$88,485	\$11,337	12.9
Fixed charges.....	50,000	50,000	—	—
Surplus.....	\$49,822	\$38,485	\$11,337	29.4
Surplus to Aug. 31.....	83,371	56,514	26,857	47.6
Surplus, 3 months.....	\$133,193	\$94,000	\$39,193	40.2

The total surplus for the first quarter of the fiscal year (beginning July 1) was thus equal to 1.9 per cent. on the stock; last year the surplus was 1.35 per cent. for the quarter.

Covington & Macon.—Work on this road is now being pushed, and a large lot of steel rails has been received. Tracklaying will be resumed as soon as the iron bridge over the Ocmulgee River is completed.

Dayton & Ironton.—This road was transferred to the Cincinnati, Hamilton & Dayton Co. on Nov. 15, when the officers of that company took formal possession.

Dublin, Wrightsville & Tennesse.—This company has been formed by the consolidation of the Dublin & Wrightsville and the Wrightsville & Tennesse companies. The line owned by the consolidated company extends from Tennesse, Ga., southward to Bruton, 27½ miles, and is under construction to Dublin, about 5 miles further. The company is controlled by the Central Railroad Company of Georgia.

Dubuque & Northwestern.—This company, which has built the extension of the Minnesota & Northwestern

road in Iowa, has been consolidated with that company, as noted elsewhere.

Eastern.—In Boston, Nov. 22, a bill in equity was filed in the Supreme Court by M. M. Canniff, of Boston, and other stockholders against the corporation and its officers. The bill asks for an injunction to restrain the officers of the road from carrying out the announced plan of exchanging certificates of indebtedness to the amount of \$3,150,000 for preferred stock.

East Tennessee, Virginia & Georgia.—The statement for September and the three months of the fiscal year from July 1 to Sept. 30 is as follows:

	September.		Three months.	
	1886.	1885.	1886.	1885.
Earnings	\$394,380	\$379,424	\$1,000,237	\$1,007,497
Expenses.....	227,173	216,890	677,848	579,537
Net earnings.....	\$167,207	\$162,534	\$322,389	\$427,960

For the three months the gross earnings increased \$82,740, or 8.2 per cent., and the expenses \$98,311, or 17.0 per cent., the result being a decrease of \$15,561, or 3.6 per cent., in the net earnings.

Florida Railway & Navigation Co.—This company has completed a belt line about 1½ miles long at Jacksonville, Fla., connecting its main line with the Fernandina & Jacksonville Division. The trains of that division now run into the new central station.

Fort Worth Western.—This company has been organized to build a railroad from Fort Worth, Tex., to Albuquerque, N. M. Surveys for the line are in progress, and 40 miles are located. The contract for grading this section has been let to J. P. Hughes of Fort Worth.

Grand Rapids & Indiana.—Notice is given that the Muskegon, Grand Rapids & Indiana road, this company's new branch to Muskegon, Mich., will be opened for traffic Dec. 1. The stations on this line, with the distances from Grand Rapids, are: Kinney, 7; Herrington, 13; Westchester, 17; Ravenna, 22; Sullivan, 28; Eggleston, 33; Fruitport Junction, 36; Muskegon, 50. Fruitport Junction is 7 miles from Fruitport.

Helena & Red Mountain.—This line is now completed from Helena, Mont., to Red Mountain, a distance of 18 miles. It reaches an important mining district, and will be operated as a branch of the Northern Pacific. The road will be paralleled for most of its length by the Montana Central, which is now under construction in the St. Paul, Minneapolis & Manitoba interest.

Illinois Central.—Notice is published that the company purposes to offer \$1,000,000 of new stock to its stockholders at the price of 136, in January next.

Lackawanna & Pittsburgh.—This company's statement for the quarter ended Sept. 30 shows: Gross earnings, \$19,291; expenses, \$24,420; loss, \$5,129. Other income (\$299) reduced the deficit to \$4,830. Charges (not including interest on bonds) were \$719, making a total deficit of \$5,549 for the quarter.

Lake Erie & Western.—The plans for the reorganization of this company not having been entirely successful, Messrs. Frank C. Hollins & Co. have issued a circular which says that the division of its railroad property would be injurious to all the securities of the Lake Erie & Western Co., and "if the stockholders choose to subscribe the amount necessary to pay the interest in default and some other claims before the date of the sale, the Court can probably be induced to dismiss the foreclosure proceedings and return the property intact to the company. The total amount required to be raised is about \$1,000,000. There have already been subscribed by the stockholders \$435,000. The Receiver has in hand \$100,000. By contributing \$6 per share in addition, the stockholders can raise enough to pay the balance, and leave the company a moderate amount of money in the treasury to meet unforeseen contingencies."

Gross earnings, 4 months ending November 1, 1886, \$497,000; net earnings, \$177,000; deduct equipment charges, same period, \$27,000; surplus, \$150,000. Interest on the first-mortgage bonds for the same period, if paid, would amount to \$92,480. Stockholders will be asked to protect themselves by subscribing an additional 6 per cent. of their holdings. Those who pay assessment, will receive certificates entitling them to preferred stock to the amount of the assessment already paid, as well as of the new assessment, as soon as such preferred stock can be issued.

Maine Central.—It is understood that negotiations are in progress between this company and representatives of the towns interested, for the construction of a branch from Ellsworth, Me., eastward to Calais, along the route projected some 15 years ago for the Maine Shore Line road. It is understood that the company has made a proposition which is very likely to be accepted by the towns.

Martha's Vineyard.—This company's statement to the Massachusetts Commission for the year ending Sept. 30 is as follows:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Earnings.....	\$5,126	\$6,130	D. \$1,004	16.7
Expenses.....	4,670	3,982	I. 688	17.2
Net earnings.....	\$456	\$2,148	D. \$1,692	78.9

Interest accruing last year was \$2,019, showing a deficit of \$1,563 for the year. The road carried 19,647 passengers 163,600 miles, at an average rate of 3.5 cents per mile.

Merrill & Abbottsford.—This company has been organized to build a railroad from Abbottsford, Wis., eastward to a point on the Wisconsin Central line in township 29, and thence by diverging lines to Wausau and Merrill. The total mileage will be 80 miles and the capital stock \$1,600,000.

Mexican National.—The recent agreement executed Oct. 15 by Mr. Smithers, as representative of Matheson & Co. of London, and by Gen. Palmer of the Mexican National, has now been ratified by all parties, including the bondholders. The road has 489 miles completed on the north end and 406 at the south, with a gap of 370 miles between, and when all is finished it will make a line of 1,340 miles, including branches. The present mortgage is to be foreclosed and then, to provide money to complete the intervening gap of 370 miles between the northern and southern divisions, a new first-mortgage at 5 per cent. of about \$9,000 per mile will be created over the whole property. This mortgage will suffice to complete the gap, enable the company to own its own equipment, and leave \$1,000,000 in the treasury for future requirements. The present bonds will form the next charge upon the property at about \$16,000 per mile (provision being made to increase it to \$25,000 per mile, but only to redeem the prior bonds by the additional issue), and these bonds are to be divided into two classes, A and B, say of about \$8,000 per mile each, bearing 6 per cent. per annum interest, the interest upon the A bonds being cumulative and that upon the B bonds payable out of each year's income. The claims of the Mexican National Construction Co. are to be settled by the creation of \$7,000,000 6 per cent. income bonds, ranking next after the mortgage bonds now in existence. The \$33,000,000 of common stock will remain as it is, and will be admitted into the new company free from any assessment."

Minnesota & Northwestern.—The Dubuque & Northwestern Co., which has built the extension of this road in Iowa, has been consolidated with this company, the name Minnesota & Northwestern remaining unchanged. By the terms of the consolidation the Dubuque & Northwestern stockholders received for each 5 shares of their stock 2 shares of the preferred and 3 of the common stock of the Minnesota & Northwestern Co. The transfer of the road was made on Nov. 17.

Mississippi River & Northwestern.—This company has filed articles of incorporation to build a railroad from Little Rock, Ark., southeast to some point on the Mississippi River. The capital is fixed at \$300,000.

Missouri Pacific.—The contractors on this company's Topeka, Salina & Western Branch report the grading completed from Salina, Kan., westward to the west line of Ness County, 126 miles, with track laid on 115 miles. This road runs between the Atchison, Topeka & Santa Fe and the Kansas Division of the Union Pacific. After the main line is finished a branch is to be built from Genesee to Hutchinson, 40 miles, and another to Great Bend, 12 miles. On the eastern end of this line trains are now running from Council Grove to Salina, 70 miles.

The Council Grove, Osage City & Ottawa Branch has now track laid from Ottawa, Kan., westward 64 miles, leaving only 6 miles to be completed to reach Council Grove, where it will connect with the Topeka, Salina & Western line.

Work is progressing on the branch from Paola to Kansas City, and the tracklaying will be completed as soon as a legal dispute over the right of way is settled.

New Orleans & Fort Scott.—This company has filed articles of incorporation in Arkansas providing for a railroad from a point near Hamburg, on the Louisiana line, north-west, across the state to the Missouri line, passing through Hot Springs and Clarksville. The company is already incorporated in Louisiana and Kansas, and its projected line is to run from New Orleans to Fort Scott, Kan. The length of line proposed in Arkansas is about 525 miles.

Northern Central.—The statement for October and the ten months to Oct. 31 is as follows:

	October.		Ten months.	
	1886.	1885.	1886.	1885.
Earnings.....	\$516,825	\$534,011	\$4,523,658	\$4,490,629
Expenses.....	325,991	289,885	2,953,139	2,693,503
Net earnings.....	\$190,834	\$244,126	\$1,570,519	\$1,797,126

For the ten months the gross earnings increased \$24,029, or 0.5 per cent., and the expenses \$259,636, or 9.6 per cent., the result being a decrease of \$235,607, or 13.1 per cent., in the net earnings.

Ohio Valley.—At a meeting held in Jackson, Tenn., Nov. 19, the Tennessee and Kentucky companies of this name were consolidated. It was also resolved to ask the city of Jackson for a subscription of \$125,000 in aid of the road.

Old Colony.—At the annual meeting in Boston, Nov. 23, it was voted to construct a branch road between Brockton and Easton, via West Bridgewater. Henry H. Faxon, of Quincy, offered a resolution prohibiting the giving of free passes to members of the Legislature and other state officials. It was not carried.

Omaha Belt.—Tracklaying has been completed on this road, and trains commenced running this week. The road extends from Papillion, Neb., to Omaha, a distance of 14 miles, and it has also a branch 6 miles in length around the city of Omaha. It was built for and will be operated by the Missouri Pacific Co., whose trains have heretofore run into Omaha on the Union Pacific tracks.

Pennsylvania.—The Pottsville & Mahanoy Co., which has built the line from Pottsville, Pa., to New Boston, has been consolidated with the Pennsylvania Schuylkill Valley Co., which built this company's line from Philadelphia to Pottsville. The stock of both companies is owned by the Pennsylvania Railroad Co., which works the line.

As noted elsewhere, all sorts of rumors are current as to the negotiations in progress between this company and the Baltimore & Ohio. The Philadelphia *Ledger*, which is usually well informed on Pennsylvania Railroad matters, says: "The inspiration of the present movement in the stock market seems to be chiefly based upon the alleged tripartite agreement between the Reading, Pennsylvania and Baltimore & Ohio, by which they are hereafter to conduct their respective traffics in harmony, and interchange trade with each other in a way to produce mutual benefits. If this policy can be carried out effectively, it will be a good thing all around. The present Reading management, for instance, can well afford to give the Pennsylvania Railroad coal to carry to markets which are reached only by the Pennsylvania system, if in return the Reading can get a profit on its coal and can secure new traffic for its own lines which can be hauled to advantage. The Baltimore & Ohio Railroad can also well afford to exchange for a cheap route of admission to Baltimore for its northern branch such traffic as the Pennsylvania Railroad can carry for it east and north of Philadelphia; and to accommodate this the new line can at several places be joined with the Pennsylvania system. While such exchanges may affect routes of traffic, it may be regarded as about settled that minor inconveniences or losses will not be permitted to stand in the way of greater general advantages to the companies affected. The present management of the Reading, for instance, can get much more advantage out of additional coal sales at a profit than by carrying through traffic between Philadelphia and New York (over leased lines) at prices that usually approximate a loss. These matters are now being carefully considered by all the parties concerned."

At a conference between Pennsylvania Railroad and city officials in Jersey City, Nov. 23, Engineer William H. Brown submitted his plans for the elevation of the railroad tracks in Jersey City. At present the company's trains cross most of the main thoroughfares of the city at grade. The plan submitted by the company contemplates the closing of Greene street, the street nearest the passenger depot, which is now practically closed and impassable by its maze of track, the arching of Washington street, next west of Greene street, which is also a very dangerous crossing, and the opening of Railroad avenue, beyond Henderson street, for free use. Now only about 24 ft. of the avenue, a narrow strip on either side of the railroad fences, is open to use. The company proposes to build an iron trestle from Merseus street, which lies near the foot of the hill east to Henderson street. From Henderson street east to the yards a gradually declining wall is to be built of stone and filled in solidly. At Greene street it will reach grade. At Henderson street the wall will be 18 ft. high. At Washington street an arched roadway is to be built in the wall for the free passage of teams. The arch will be 13 ft. in the clear—as high as the gates through which teams now pass into the ferry-house. At the meeting some objections were made, but there is little doubt that the project will be favorably recommended by its Committee to the Board of Aldermen. It is understood that upon the acceptance of the plan by the city the company will go to work at once.

Philadelphia & Reading.—It is reported that this

company has made an agreement with the Pennsylvania Railroad Co. providing for a division of the coal tonnage from the Schuylkill Valley. The agreement, it is said, provides that the Pennsylvania's new line to Pottsville is to receive a certain amount of coal from the Reading collieries at a fixed rate. Other arrangements in relation to a division of business are also said to have been made, but the terms of the contract have not been made public.

The Receivers met in Philadelphia, Nov. 23, and after a long conference gave out the following for publication: "At a meeting of the Receivers of the Philadelphia and Reading Railroad Company held to-day it was determined that, as there is no money in hand applicable to the payment of interest on the consolidated bonds, due on Dec. 1 prox., the same will not be paid."

Appended to the foregoing was a statement that it was expected the plan of reorganization would be soon published, and that the interest on the consolidated bonds would soon be provided for.

Prescott & Arizona Central.—The grading of this road is now nearly completed from Prescott Junction (Chino), Ari., southward to Prescott, the capital of the territory, a distance of 72 miles. The track is reported laid for 50 miles, and the work is being pushed, as the road must be finished by Dec. 31 to secure the subsidies voted to it. The Atlantic Construction Co. is contractor for the road.

Richmond & Danville.—As noted elsewhere, the parties who recently secured control of the Richmond & West Point Terminal Co. now control this company also, having purchased a majority of the stock. The stock thus bought is to be held in trust by the Terminal Co., so that that company will have permanently the control of the Richmond & Danville line, thus rather reversing the original condition of affairs, when the Terminal Co. was organized as an auxiliary to the Richmond & Danville and the majority of its stock was held in the Richmond & Danville treasury.

Richmond, Fredericksburg & Potomac.—The annual meeting of this company was held in Richmond, Va., Nov. 17, the commissioner appointed by the Court, as noted last week, being present to supervise and report the result of the election. The suit referred to will not, however, be continued, as it was announced at the meeting that a compromise had been made which will practically adjust the differences between the contending interests. Under this compromise the Baltimore interest in the road and the stock controlled by the Atlantic Coast Line will each name an equal number of directors, and the directors appointed by the state of Virginia to represent its stock will be arbitrators in case of any difference of opinion in relation to the policy of the road.

Richmond & West Point Terminal Co.—The stockholders' meeting which was to have been held in Richmond, Nov. 19, was adjourned, and the annual meeting will not be held until Dec. 7. The new owners of the stock are now, however, in control of the management, the old directors having resigned one by one, permitting their successors to be chosen by the board.

On Nov. 20 it was announced that the new management had succeeded in purchasing a controlling interest in the Richmond & Danville Railroad Co., having bought a majority of the stock of that company. The stock was bought in different parcels, and at pretty high prices, the amounts paid being reported to range from 175 to 230, and the stock costing the Terminal Co. an average of about \$200 per share. On the same date the Terminal Co. issued the following announcement to its stockholders:

"This company has purchased a majority of the stock of the Richmond & Danville Railroad Co.

"To provide the \$5,000,000 cash required in payment thereof the Terminal Co. will issue \$5,000,000 preferred stock, bearing 5 per cent. cumulative, yearly dividends, payable semi-annually.

"Each holder of 100 shares of the Terminal Co. may subscribe toward the said \$5,000,000 to the extent of one-third of the par value of his stock, and shall receive for his subscription 83 1/3 shares of preferred stock and 50 shares of the increased common stock.

"Subscriptions will be payable at the Central Trust Co., in three equal installments, Dec. 3, Jan. 3, Feb. 3.

"Payments may be anticipated at a rebate of 6 per cent. interest per annum."

This circular in its terms sufficiently explains the present state of affairs.

What the exact intentions of the management are is not yet announced. It is reported, however, that the Richmond & Danville will be operated as one of the properties of the Terminal Co. simply, and that the leases of the Virginia Midland, the Western North Carolina, the Charlotte, Columbia & Augusta and the Columbia & Greenville roads to the Richmond & Danville Co. will be cancelled, and that all those roads will be operated under their own organizations as heretofore, but directly under the control of the Terminal Co., the entire system to have one management.

Rome & Carrollton.—This company's engineers are now locating the line of the extension of the road from Cedar-town, Ga., to Carrollton, and work will be begun on the grading as soon as the engineers are through. The company is also making preparations to change the completed section of its road from Rome to Cedar-town, 22 miles, from 3 ft. to standard gauge.

Rome & Decatur.—Grading has been begun on the first section of this projected road, extending from Rome, Ga., westward to the Alabama line, a distance of 18 miles, and it is understood that the other sections of the road will shortly be let. The line is to extend from Rome westward to Decatur, Ala., a distance of 145 miles.

Rome, Watertown & Ogdensburg.—The statement for the quarter ending Sept. 30 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.....	\$649,375	\$483,435	I. \$166,940	75.8
Expenses.....	421,815	295,155	I. 126,660	42.9
Net earnings.....	\$227,560	\$188,280	I. \$39,280	17.2
Other receipts.....	7,114	7,470	D. 356	4.8
Total net income.....	\$234,674	\$195,750	I. \$38,924	19.9
Charges.....	254,377	149,237	I. 105,140	70.5
Surplus.....	\$180,297	\$46,513	I. \$133,784	285.8

Charges include interest, rentals and taxes. The leased Utica & Black River road is included in the statement this year, but not last year.

St. Louis, Carondelet & Oak Hill.—Work is now in progress on the grading of this road, which is to be a belt line about 7 miles long, extending from South St. Louis (Carondelet) to a junction with the St. Louis & San Francisco, the Missouri Pacific and the Wabash lines west of St. Louis. It will be an independent line, and will be open to all roads desiring to use its tracks for connection.

St. Louis, Fort Scott & Wichita.—The Newton Branch of this road, formerly known as the Ellsworth, McPherson, Newton & Southeastern road, is now completed to McPherson, Kan., 61 1/2 miles from the junction with the main line at Eldorado. Trains began to run through to McPherson on Nov. 7.

San Antonio & Aransas Pass.—The northwestern extension of this road is now located from San Antonio, Tex., northwest to Kerrville, and grading is in progress. The road bed is nearly completed to Boerne and tracklaying will soon be begun. The engineers have begun the survey of the line from Kerrville to San Saba.

Sanford & Lake Eustis.—This road is now completed to Sorrento, Fla., 18 miles westward from the starting point at Sanford. Work is progressing on the line to Tavares, which will, it is expected, be completed by the close of the year.

Seaboard & Roanoke.—Grading has been begun on a branch line to run from this road at Boykins, Va., southward through the Meherrin Valley to Murfreesboro, N. C., a distance of 10 miles. It is understood that this branch will be extended some 10 miles further to Winton, on the Chowan River.

Southern Pacific.—The last time-table on the Northern Division gives the stations on the new part of the Soledad line as below, the distances given being from Castroville, the junction with the Monterey line: Soledad, 33.2; Cholona, 42; Coburns, 48.5; Kings City, 53.5; San Lucas, 62.2; San Ardo, 72.7; Bradley, 85.8; San Miguel, 97.1; Paso Robles, 106.4; Templeton, 111.9 miles. The new line begins at Soledad. Templeton, which is 221.6 miles from San Francisco, is the operating terminus at present, although the track is laid for some distance beyond.

Southern Pacific Co.—The statement for the month of September is as follows:

	At System.	Pac. System.	Total.
Earnings.....	\$723,771	\$2,233,809	\$2,957,580
Expenses.....	557,186	1,080,021	1,637,207
Net earnings.....	\$166,585	\$1,153,788	\$1,320,373
Rentals received from leased lines.....			46,680
Total net income.....			\$1,367,053
Fixed charges.....		\$1,162,836	
Construction and improvement.....		19,658	
			1,182,494

Surplus for the month.....\$184,559

Fixed charges include interest, rentals, taxes, United States sinking fund requirements and the guarantee to the Central Pacific Co.

The Pacific System shows for the month an increase of \$220,195, or 10.9 per cent., in gross earnings, but a decrease of \$56,284, or 2.2 per cent., in net earnings. The Atlantic system lost \$126,420, or 14.9 per cent., in gross earnings, and \$189,850, or 53.3 per cent., in net earnings.

For the nine months to Sept. 30 the company's payments, including all charges and \$258,071 for construction and improvements, exceeded the net earnings of its lines by \$335,270.

The earnings of the Atlantic System in detail for September were as follows:

	Gross earnings.	Net earnings.
	1886.	1885.
Gal. Har. & S. A.....	\$218,811	\$322,143
G. W. Texas & Pacific.....	4,343	7,500
Louisiana Western.....	57,367	47,008
Morgan's La. & Tex.....	335,824	372,692
N. Y., Texas & Mexican.....	18,440	23,546
Texas & New Orleans.....	59,285	77,304
Total Atlantic system.....	\$723,770	\$850,191
	\$166,585	\$356,434

* Deficit.

The lines of this system show a large increase in working expenses and a loss in net receipts. Most of them show a decrease in gross earnings also.

Turtle Creek.—Work has been begun on this road by the contractors, Booth & Flynn. The line will extend from Braddock, Pa., on the main line of the Pennsylvania Railroad, to Saltburg on the West Run Division of the same road. It will be 27 miles long, running through a region rich in coal. Its officers and directors are all connected with the Philadelphia Gas Co., and one of the objects of the road is to carry supplies to the numerous wells which that company is sinking in the Westmoreland County natural gas field. It is also expected that it will have a considerable business in coal and local freight.

Vermont Railroad Commission.—The Railroad Committee of the Vermont Legislature has prepared a railroad commission bill as a substitute for the several bills presented to the Legislature. This bill provides for a board of three commissioners, to be appointed by the Governor, which shall have a general supervision over the railroads in the state, and shall have power to require repairs of railroads, changes in stations, changes in rates and other matters in regulation of the lines. The board's power, apparently, are to be chiefly advisory, and in case of any difference in regard to the recommendations that they may make the Supreme Court is to be final judge as to the reasonableness of the requirements, and its mandate will be needed to compel the railroad companies to comply. The board is to have power to require the railroads to make statements of their business and to submit their books and accounts to examination, and is to make a report to the Legislature every second year.

The bill has been received with much favor, and is apparently pretty sure to pass the Legislature.

Vicksburg & Meridian.—A dispatch from Vicksburg, Miss., Nov. 19, says: "Judge Hill, of the Federal Court, has rendered a decision in the Vicksburg & Meridian Railroad case, which authorizes the Receiver to fix the transportation rates of the road from point to point in the state so as to pay running expenses and give a 6 per cent. profit on the cash value of the road. The decree provides that the Receiver is to submit the tariff rates framed by him to the Railroad Commission.

Wilmington & Weldon.—At the annual meeting in Wilmington, N. C., Nov. 20, resolutions were passed approving the contract made for the purchase of the road-bed and right of way of the Clinton & Warsaw Railroad, and authorizing the directors to complete that road and to operate it as a branch.

A resolution was also passed authorizing the directors to issue income bonds to the stockholders to such an amount as may be considered advisable, to represent improvements and additions to the property made from the net earnings of the road.

Wisconsin Central.—The location of the branch to Bessemer and the iron mines in the Penokee Range has been completed, and work on the grading will soon be begun.

Surveys are to be made for a branch to Geneva Lake, Wis. Lines will be run from Burlington and from Wheatland on the new extension to Chicago.

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Del. & Hudson Canal Co.....	250
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Eliz., Lex. & Big Sandy.....	734
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Galveston, Har. & San Antonio.....	770
Galveston, Houston & Bea.....	307
Georgia Pacific.....	272
Georgia Railroad.....	714
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Grand Rapids & Indiana.....	323
Grand Trunk.....	394
Gulf, Colorado & Santa Fe.....	454
Hanover, Lanc. & Gettysburg.....	414
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Leh. & Wilkes-Barre Coal Co.....	180
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Louisville & Nashville.....	596
Louisville, N. Albany & Chi.....	255
Maine Central.....	66
Manchester & Lawrence.....	414
Marquette, Houghton & Ont.....	414
Massillon & Cleveland.....	651
Memphis & Charleston.....	570
Mexican Central.....	302
Michigan Central.....	23
Michigan & Ohio.....	343
Min. Lake Shore & Western.....	191
Minnesota & Northwestern.....	120
Mississippi & Tennessee.....	120
Missouri, Kansas & Texas.....	566
Missouri Pacific.....	366
Mobile & Girard.....	498
Montpelier & Wells River.....	498
Morgan's La. & Tex.....	770
Nashua & Lowell.....	414
Nashville, Chattanooga & St. L.....	654
Natches, Jackson & Col.....	104
Naugatuck.....	29
New Brighton & New Castle.....	651
New Castle & Beaver Valley.....	651
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Pittsburg, Cleve. & Toledo.....	688
Pittsburg, Ft. Wayne & Chi.....	651
Pittsburg & Lake Erie.....	68
Pittsburg Junction.....	85
Pitts., McK. & Younglohen.....	65
Pitts., Wheeling & Ky.....	120
Portland & Ogdensburg.....	120
Providence & Worcester.....	139
Pullman's Palace Car Co.....	750
Richmond & Allegheny.....	104
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Richmond, Fred. & Potomac.....	86
Rochester & Pittsburgh.....	86
Rome, Wat. & Ogdensburg.....	55
Rutland.....	493
St. Jo. & Grand Island.....	734
St. L., Alton & Terre Haute.....	548
St. L., Iron Mt. & So.....	367
St. L. & San Francisco.....	191
St. L., Van. & Terre Haute.....	292
St. Paul & Duluth.....	156
St. P., Minn. & Manitoba.....	594
Savannah, Fla. & Western.....	651
Seaboard.....	587
Shenandoah Valley.....	570
Shoofly City & Pacific.....	652
South Carolina.....	652
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Southern Pacific Co.....	470
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Oregon Railway & Navigation Co.

The lines operated by this company at the close of its last fiscal year, June 30 last, were as follows, by water and rail:

	Miles.
Ocean Division, steamer line Portland-San Francisco.....	670.0
Puget Sound steamboat lines, about.....	15.0
River Division, steamboat lines, about.....	239.0

Total water lines.....1,150.0

Railroad Division :	
Portland to Riparia.....	301.0
Bolus Junction to Dayton.....	13.0
Patash Junction to Pomeroy.....	28.5
Walla Walla to Blue Mountain.....	19.9
Umatilla to Huntington.....	217.3
Pendleton to Centerville.....	17.1

